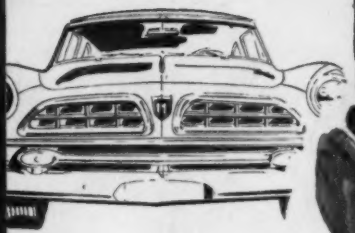
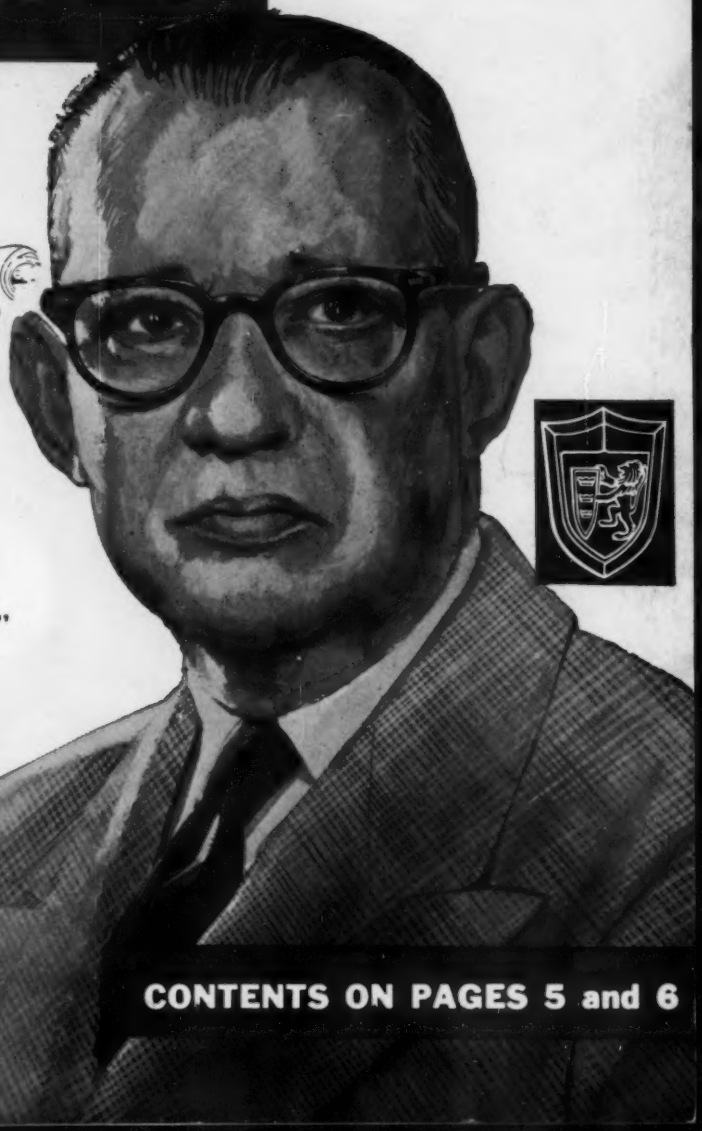
Machine and Tool BLUE BOOK

FEBRUARY 1955





Chrysler's Snyder
" . . . record
employment in '55!"

A HITCHCOCK
PUBLICATION

CONTENTS ON PAGES 5 and 6

Efficiency in Cutting-off is Important

Practically all machining operations start with pieces cut-off from bars or billets. Hence, inefficiency, or lack of capacity, in the cut-off department can hold up or stagnate the entire plant.

A. Are all-ball-bearing and provide a quick return; therefore they run FASTER than others on the same work.

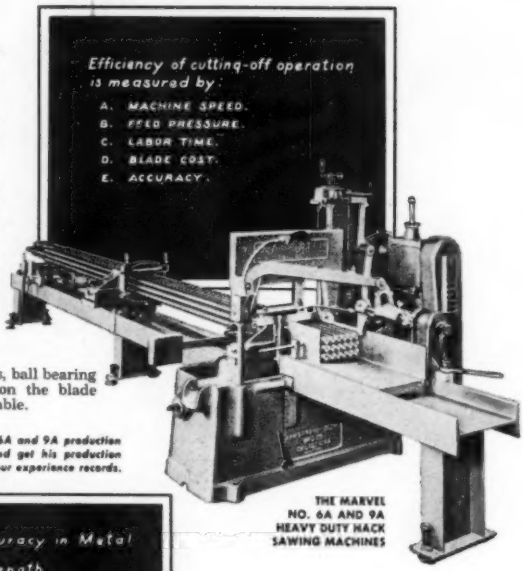
B. Can apply as much as 1200 pounds feed pressure—two to ten times as much as other hack saws and band saws.

C. Are fully automatic, requiring no more operator attention than an automatic screw machine; and set-up for any bar size and cut-off length is extremely simple.

D. Use a non-breakable high speed hack-saw blade—the type of saw blade that produces the greatest number of square inches of metal cut per dollar of blade cost—two to ten times (or more) as much as any band saw.

E. Because of their exceptional sturdiness, ball bearing reciprocating frame, ability to tension the blade "truly taut", their accuracy is dependable.

If you are not using modern, improved MARVEL NO. 6A and 9A production hack saws, call the local MARVEL Field Engineer and get his production and cost estimates on your work—to compare with your experience records.



THE MARVEL NO. 6A AND 9A HEAVY DUTY HACK SAWING MACHINES

Formula for Accuracy in Metal Sawing:
ACCURACY = (Length, Straightness, Squareness)
(Straightness, Squareness) = (Blade Rigidity, Blade Toutness)
MARVEL
HIGH-SPEED EDGE
ARMSTRONG-BLUM MFG. CO.
CHICAGO 22 MADE IN U.S.A.

Write for catalog C-55—showing and describing eleven different series of Metal-Cutting Sawing Machines and MARVEL-High-Speed-Edge Hack Saw Blades and Hole Saws.

The composite MARVEL High-Speed-Edge Hack Saw Blade—cuts **any** machinable material efficiently. There is no time lost changing blades for different types of steel; no time lost replacing shattered blades, because MARVEL High-Speed-Edge Hack Saw Blades are positively **unbreakable.** These superior blades have the finest high speed steel cutting edge welded to a strong alloy steel body. They will stand-up under the highest speeds and heaviest feeds attainable on any make hack saw. Can be safely tensioned tauter than any other blade—cut-off not only straight but also square and with less stock loss.

MARVEL Metal Cutting SAWS
Better Machines · Better Blades

ARMSTRONG-BLUM MFG. CO. 5700 West Bloomingdale Avenue • Chicago 39, U.S.A.

Bellows COLLET CONTROLLER

low-cost automatic stock-holding for hollow-spindle lathes and other rotating spindle machines.

★ **never stop the machine**

★ **stock will NOT Slip**

★ **operate manually or automatically**

Take a critical look at your methods of loading and holding work. Are they eating into profit margins by robbing you of valuable machine time? The fractions of seconds wasted while stock is positioned, while collets and holding fixtures are set and reset, total up to an alarming theft of productivity.

The Bellows Collet Controller, powered by a special aluminum non-rotating air cylinder, opens and closes collets faster than the eye can follow. It can be pushbutton controlled or interlocked with other machine elements for automatic operation. The spindle motor of the machine need never be stopped. Holding pressures are always uniform (25 times air pressure applied). Clamping is instantaneous and positive. Mounting is easy. And cost is low.

1061 A

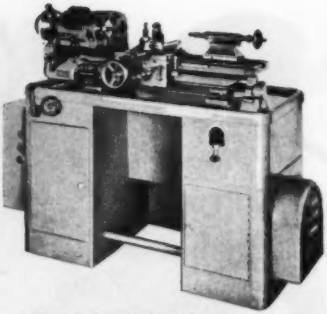
FOR FULL INFORMATION
Write for
BULLETIN BC-60
ADDRESS DEPT. MTB 255

The Bellows Co.
AKRON 9, OHIO
CONTROLLED-AIR-POWER FOR FASTER, SAFER, BETTER PRODUCTION

obsolete machines are costing you *plenty!*

. . . you can make money with these 4 Wade precision machines

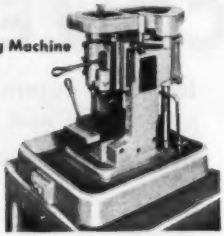
To keep pace with your competition, you need the latest, *most efficient* production machines you can buy. Here are four that are remarkably accurate — designed and built throughout for precision work to close tolerances. Some of the features on each machine are patented and exclusive. All machines are carefully described in Bulletins, available on request.

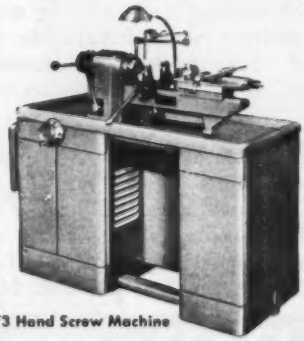


No. 8A Tool Maker's Precision Lathe

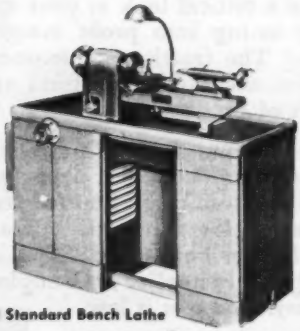
A variable speed feed for the feed rod is available as optional equipment. It provides an independent powered longitudinal or cross feed which permits the operator to change the rate of feed while the tool is under cut to secure the desired work finish during turning, facing or boring operations. The rate of feed for variable speed feed is controlled by a potentiometer.

Hand Profiling Machine





No. 73 Hand Screw Machine



No. 73 Standard Bench Lathe

Write to **51 RIVER STREET**

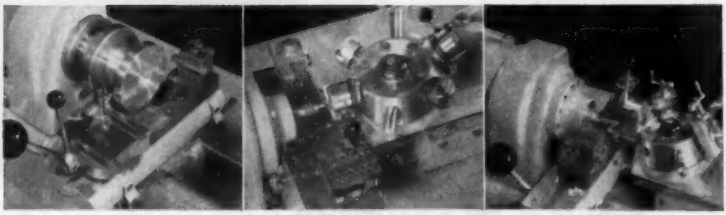
THE WADE TOOL CO.

WALTHAM 54, MASS. U. S. A.

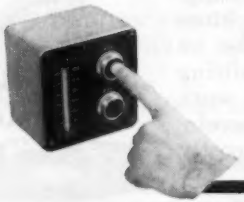
MAKERS OF PRECISION TOOLS FOR AMERICAN INDUSTRY

HARDINGE
ELMIRA, N.Y.

NEW Variable Speed Machine
for
PRODUCTION DEPARTMENTS



Large Work | Threading | Small Work



Simply Push a Button for Exact Spindle Speed

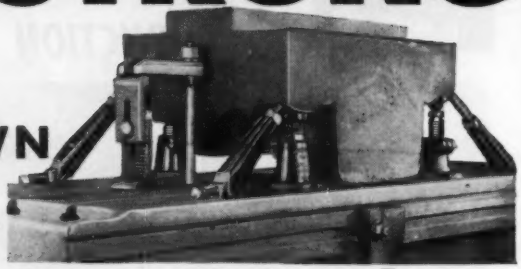
Produce More Precision Parts at Lower Cost with this NEW Second Operation Machine

Send for Free illustrated Bulletin DSM59

HARDINGE BROTHERS, INC. ELMIRA, NEW YORK, U.S.A.

ARMSTRONG

SET-UP *and* HOLD-DOWN TOOLS



PLANER JACKS

ARMSTRONG Set-up and Hold-down Tools reduce setting-up time—keep men and machines producing. Designed for use on planers, drill presses, milling machines, etc., they hold work securely and rigidly, and thereby reduce spoilage and prevent costly accidents.

T-SLOT CLAMP

NON-SKID JACKS

Your local Armstrong Distributor carries ARMSTRONG Set-up and Hold-down Tools in stock in sizes for every operation. Stop haphazard setting-up methods. Provide each of your machines with a full complement of ARMSTRONG Set-up and Hold-down Tools.

Write for Circular

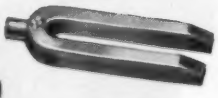
STEP BLOCK

ARMSTRONG BROS. TOOL CO.

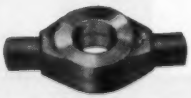
"The Tool Holder People"

5208 W. Armstrong Ave., Chicago 30, U. S. A.

UNIVERSAL CLAMP



T-SLOT BOLTS AND NUTS



STRAP CLAMPS

Contents

MACHINE and TOOL BLUE BOOK

FEB. 1955 • VOL. 50, No. 2

AS THE EDITOR SEES IT 89
YOURS VERY TRULY 91-92
QUICKIE IDEAS 100-101
CAPITAL ROUNDUP 103-109
QUICKIE PRODUCTS 111-112
SPECIAL REPORT ON PRESSES 172

LEADERS OF THOUGHT IN INDUSTY: Interview with Carl J. Snyder, Vice President, Production, Chrysler Corp. 95-98

FEATURED ARTICLES

PORTABLE TOOLS
Ingenious Application of Portable Air Tools 115

GRINDING
Speed Grinding of Power Steering and Breaking Rotors with Automatic Grinding Set-Up 119

BENDING
You Can Save Time and Money by Bending the Elbows in Large Size Conduit, by Oscar Kasbohn 122

AUTOMATION
Automatically Operated Shaving Machine Chamfers and Shaves Automotive Pistons 126

TIME STUDY
Part 7 . . . Balancing the Production Line; Keeping Time Studies Up-To Date; The Marginal Operator; Correcting a Loose Rate Structure, by Harold R. Nissley 128

PRESS ATTACHMENT
Hydraulic Press Jack Solves Problem of Producing Shotgun Shells by Dayton Rogers 142

PANTOGRAPH
Four-Spindle Pantograph Roughs, Finishes Track of Irregular Radii 144

DRILLING
Drill Press Department Provides High Production Volume 146

DRAWING TITANIUM
Deep Draw Titanium in One Operation by R. G. Gillespie 172

SHOP HINTS

Cutting Tools Save Money with Tight Micro Finish—151
Machining Rings on Miller—152
Setting Cutters Central—154
Lightening Holes Routed in Single Operation—155
The Standard Straight Form Tool—156
Combination Cutoff & Chamfer Tool—158
Gauge for Checking Spiral Taper Propeller Reamers—159
Keyway Cutter Tabulation—159

MODERN TOOLS IN ACTION

Unique Fixture Doubles Output on 2-Station Broaching Machine—161
Broaching & Centering Machines—162
High Speed Circular Saw Cuts 43" Aluminum Billets—163
Two-Part Machining Gives Double Output—163
Square Carbide Inserts Slash Machining Costs on Stainless Steel—164
Surface Grinding Machine Prefinishes Steel Blanks—164
2000 Ton Clearing Press Trims Aluminum Forgings—166
Automatic Machine Taps 97 Holes in One Cycle—166
Magnesium Alloy Jet Engine Housings Roughed and Finished on Single Automatic Lathe—167
15-Ton Press Produces 300 Jet Gaskets an Hour—168

DEPARTMENTS

News of the Industry 200
What's New in Metalworking 239
Free Literature 263
The Market Place 340
Mechanics Through the Ages 342
Products Index 345
Index to Advertisers 352

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Hitchcock District Managers are Listed on Page 64.

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Your plant produces dust in a surprising number of locations. By collecting it at the source you:

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record in reducing costs

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CINCINNATI No. 420-184 Hy-Powermatic Milling Machine with Automatic Quill Retraction.

a practical approach
to pressroom modernization

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TWO NEW Verson PLANS

to solve press obsolescence problems

The extensive capital expenditures required to meet competitive pressures have put many manufacturers in an unfortunate position. Modernization is necessary if the manufacturer is to price his product competitively and still make a fair profit. However, the fair profit is necessary before he can afford the modernization. Two new Verson plans make it possible to modernize now and pay for it out of the increased profits it provides. If you are one of the manufacturers faced with the dilemma of needing modernization for better profits, but needing better profits before you can afford modernization, one of these plans may be the answer to your problems.

Customized

INSTALLMENT PROGRAM

For the manufacturer who wishes to own his own presses but minimize his initial capital outlay, Verson offers a Customized Installment Program. It is called "Customized" because the payment plan is tailored to the buyer's own financial requirements rather than to a single fixed plan. Initial payments may be as low as 10 per cent of the purchase price with the balance payable over periods ranging from six months to five years. Further information on a plan to meet your needs will be furnished on request. Please outline your requirements.

Customized

LEASING PROGRAM

For the manufacturer who wants the advantages of modern, efficient presses without capital investment, Verson offers a Customized Leasing Program. Like the Installment Program, a choice of plans is available to best suit the buyer's requirements. In addition to the basic plans, options for continuation, termination and eventual purchase are also available. Special arrangements for special machines will be considered. Further information on a leasing plan to suit your needs will be furnished on request. Please outline your requirements.

A Verson Press for every job from 60 tons up.

Verson

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TOOLING • DIE CUSHIONS • VERSON-WHEELON HYDRAULIC PRESSES

another cost saving performance record set by the GRAY PLANER CUB

Former planing time of steel bars and gibs was cut to ⅓ when this high speed GRAY PLANER CUB was put into action at a leading Midwestern metal fabricating plant.

This is accomplished by the Cub's high speed, greater power and tremendous rigidity—all essential to heavy duty carbide steel planing.

Proof of outstanding performance is the fact that this company has two more Cubs on order. Built in 24" — 30" — 36" sizes. Write for Bulletin 55.

the job: planing hi-carbon, hi-chrome steel bars

cut speed 160' per min. • return speed 300' per min. • two heads • depth of cut 3/32" • feed .040

The G.A. GRAY Company

planers • milling planers
planer type milling machines
horizontal boring machines

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Dept. D

Just an Idea... but, it carried a garage-born business to the top of a vital industry

HARVEY B. WALLACE
Founder and President

The idea was brand new but, we believed in it.

Diamond tools were thousands of years old but, ENGINEERED DIAMOND TOOLS, such as we set out to make in our garage workshop forty-four years ago, those were something new. And, like all new things, they had to be sold in the face of doubts and misgivings.

Nobody had ever before undertaken to "engineer" diamond tools to do specific jobs–but, *we* did.

Nobody had ever guaranteed diamond tools to do their jobs but we not only guaranteed our ENGINEERED DIAMOND TOOLS to do their job but guaranteed that they would do them better than any ordinary tool.

And, we kept proving it, over and over, until industries small and large knew that diamond tools engineered by Wheel Trueing represented the highest technical achievement in the industrial diamond world. Presently this idea was extended to mining operations and, later to oil field operations when we successfully pioneered oil field diamond drill bits, now used throughout the world. And, every mail carried packages of Wheel Trueing diamond selections to discriminating diamond buyers throughout industry.

Our plant has grown to be the finest in the industry and our original group of three people is now a family of two hundred, many of them outstanding specialists.

Our idea of ENGINEERED DIAMOND TOOLS is no longer ours, alone. It is now shared by all industry and practically every product of modern industry is made better, and at less cost, because of it.

There's no substitute for diamonds

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"Tru-Line" Profile Dressing Tools
Diamond Grit Tools for Thread Dressing
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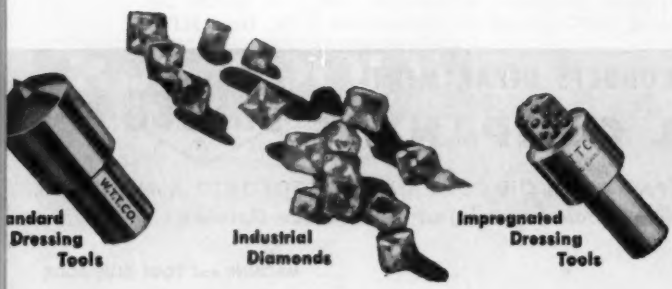


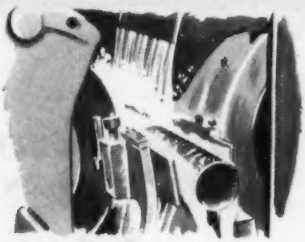
andard Dressing Tools

Industrial Diamonds

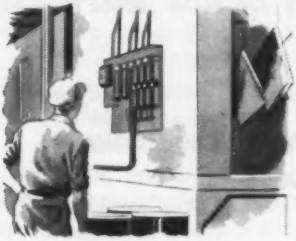
Impregnated Dressing Tools

New S.E.C.O. is Tops For These Operations

CUTTING WITH NEW S.E.C.O. Tools stay cool—require less frequent grinding. Finishes are uniformly good.



GRINDING WITH NEW S.E.C.O. Surface finishes are good. Loading and glazing of wheel are reduced—wheel life is prolonged.



WASHING WITH NEW S.E.C.O. Thorough removal of grease and dirt provides clean surfaces for smooth, long-lasting finishes.

ROLLING WITH NEW S.E.C.O. Rolls stay clean. You get maximum reductions and low power consumption.

New Sunoco Emulsifying Cutting Oil increases production, cuts operating costs. Its high machining efficiency permits uniformly good finishes, prolongs tool life. Its high detergency and purity keep tools, parts and machines clean. Its excellent mixing qualities permit its use in cold, hard or hot water. Test New S.E.C.O. in your own plant. For more information, call your nearest Sun office or write SUN OIL COMPANY, Philadelphia 3, Pa., Dept. MT-2.

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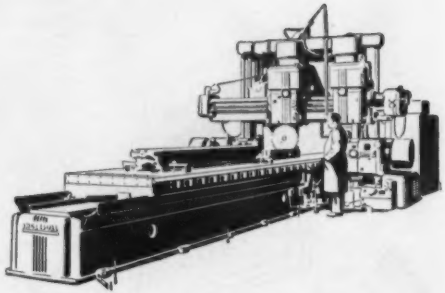
ADDRESS .....

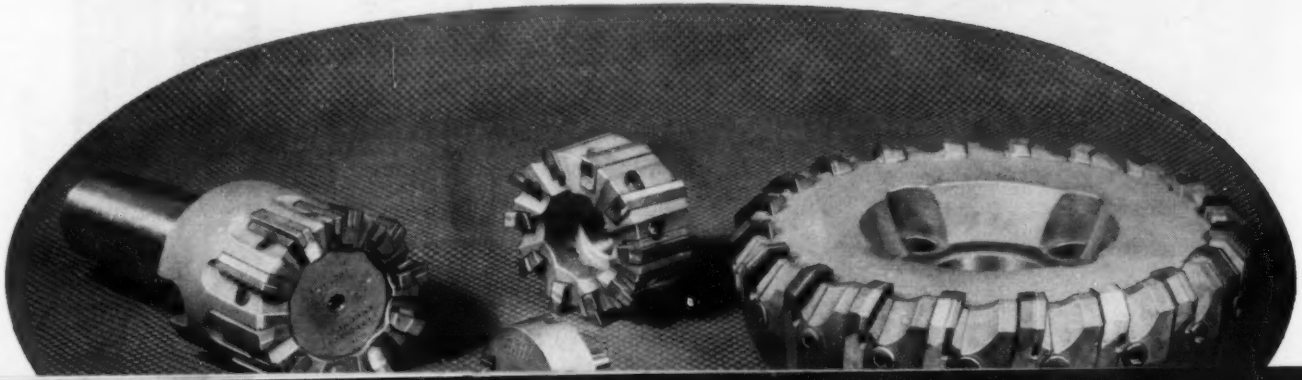
H-2

DO YOU CONSIDER THE COST OF REPLACEMENT BLADES WHEN BUYING CUTTING TOOLS?

In one year, a milling cutter in active service uses blades costing more than the original price of the cutter. *We furnish seven sets of replacements for each set of blades sold as original equipment.*



Ingersoll cutters offer the combined advantages of superior performance and substantial long-term economies in blade costs. The cost of Ingersoll blades is low because their design is simple and they are manufactured with good production equipment.



WRITE FOR Catalog 60E, describing Ingersoll Inserted Blade face mills, end mills, helical slab mills, side mills, arbor cutters, angular cutters, and boring heads.

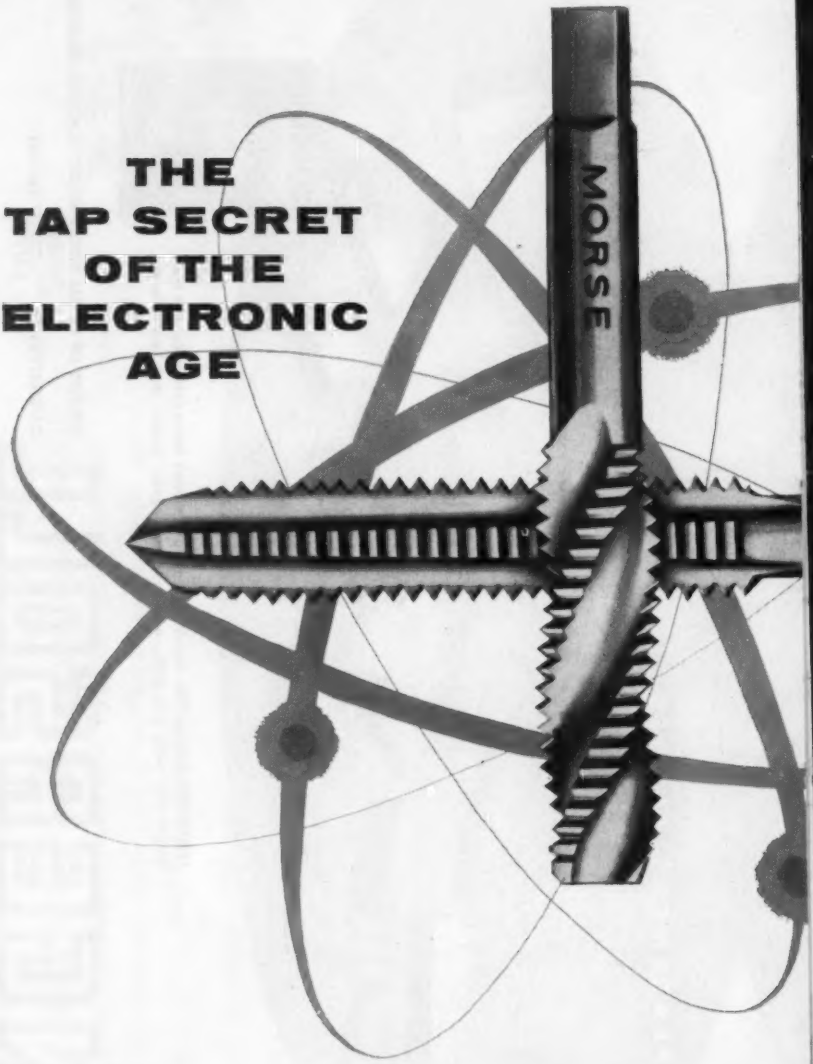
THE INGERSOLL MILLING MACHINE COMPANY

ROCKFORD, ILLINOIS, U.S.A.

BUILDERS OF SPECIAL DESIGN MILLING & BORING MACHINES

ORIGINATORS OF SHEAR CLEAR CUTTERS

THE TAP SECRET OF THE ELECTRONIC AGE



MORSE "Vectormatic Ground" Taps

The Taps with the locked-in precision

. . . quality-protected by an invisible Wall of Electrons!

This exclusive new Morse development obsoletes all previous methods of tap-manufacturing. For "Vectormatic" is an entirely new principle that introduces an unprecedented new method of close-tolerance gaging . . . with the whole gaging system controlled by an invisible wall of electrons activating a series of relays. *Gaging mechanism never touches the work.*

And another exclusive feature of Morse "Vectormatic" Grinding is the "Magic Mike" Control of Tap Sizing. The size-control mechanism and the adjusting segment of the circuit are *completely locked in,* to insure uniformity. Once the proper adjustments have been made, tolerances remain constant . . . nearly 300% closer than old thread-grinding systems.

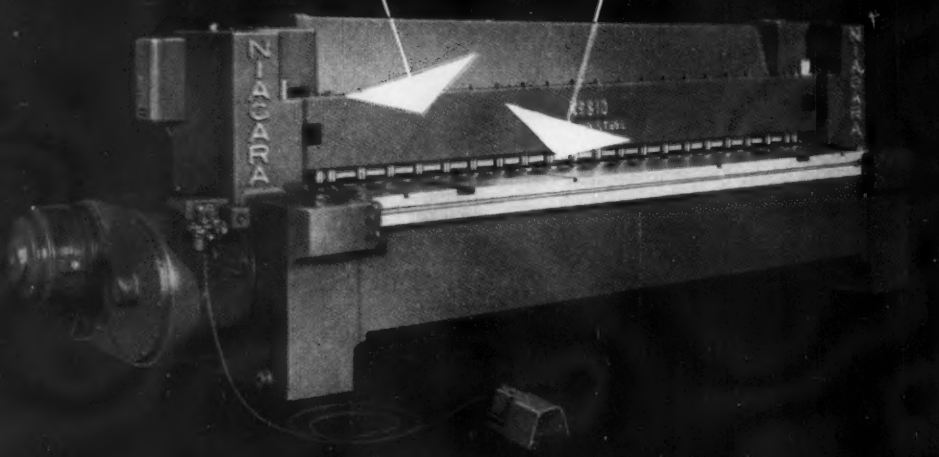
These and other features of Morse "Vectormatic" Tap Grinding give you far smoother finish, keener cutting edges, and longer tap-life than you have ever known before. And this means higher production at lower cost, on every tapping job. So order from your Morse-Franchised Distributor *today* . . . he's stocked to give you immediate delivery.

MORSE TWIST DRILL & MACHINE COMPANY
NEW BEDFORD, MASSACHUSETTS
(Division of VAN NORMAN CO.)
Warehouses in New York, Chicago, Detroit, Dallas, San Francisco

MORSE
Cutting Tools

. . . buy them by phone from your Morse-Franchised Distributor and save ordering time

SELF-COMPENSATING HOLDDOWN



NIAGARA MACHINE & TOOL WORKS 1879 75 1954

America's most complete line of presses, shears, machines and tools for plate and sheet metal work

a BIG FACTOR in the superiority of Niagara Shears

"STRAIGHT-EDGE" CUTTING ACCURACY
Positive, power actuation grips work securely for maximum cutting accuracy.

LOW IMPACT AVERTS DAMAGE AND INACCURACY
Individual pressure feet contact work with low impact, thus safeguarding both the material and bed against damage, as well as reducing noise level. No hammer-blows to mar work. No peening of bed with resulting distortion of knife seat.

SIMPLIFIED, LOW UPKEEP DESIGN
Simplicity of design and construction, involving a minimum number of parts, assures negligible servicing. With *less* to go wrong, there is *less* to repair and replace.

HOLDS WORK FLAT AND STATIONARY
Multiple pressure feet on 6" centers, applying uniform pressure, hold work flat and tight against bed to assure utmost shearing accuracy. No rippling of sheet between feet as cut progresses. Firm grip on short pieces.

HANDLES STOCK OF VARYING THICKNESS
Individual feet are self-compensating, requiring no adjustment for cutting stock of different thicknesses . . . *even at the same time.*

NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N. Y.
DISTRICT OFFICES:
Buffalo • Cleveland • Detroit • New York • Philadelphia
Dealers in principal U. S. cities and major foreign countries

In a power squaring shear, no *single* feature nor component can be fully responsible for accuracy, speed and economy. *They* result from a *combination* of features such as the self-compensating holddown; rigid, fully closed box section construction of bed and crosshead; low slope of upper knife; ample and accurately held crosshead guides; multiple point sleeve clutch — the very features that have established the marked superiority of Niagara's Underdrive Series.

For the whole story, straightforwardly presented, on America's most complete line of underdrive power squaring shears, with capacities from shim stock to 1 in. thick mild steel (lengths 3 to 20 ft.), request *Niagara Bulletin 69*. Write today.

NIAGARA

UNDERDRIVE SQUARING SHEARS

Tough grinding jobs?

Check *Vulcanaire* high speed precision grinding heads!

Grinding circular s
using Vulcan's Rot
Table and Magne
chuck.

Many seemingly impossible grinding problems have been solved by adapting Vulcanaire to standard machines or by using one of Vulcan's specially designed machines.

On Surface Grinders, merely remove wheel and guard, clamp vertical or horizontal adaptor to machine as illustrated. No belts necessary. For instance, Vulcanaire used in connection with Vulcan's Rotary Table for Surface Grinders permits the grinding of a circular slot.

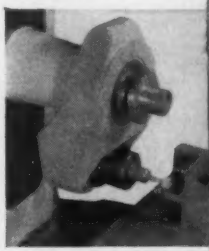
Vertical adaptor for S
face Grinders. Grindi
small slots

Adaptors are in stock to fit the spindle of Vertical Milling Machines for grinding contours, holes and slots.

On Internal Grinding Machines Vulcanaire's infinitely controlled speeds furnish the correct surface cutting speed resulting in faster production and micro finish. The adaptor sleeve fits into present housing.

Applied to Jig Boring Machines, Vulcanaire is liked by leading precision manufacturers because its accuracy is guaranteed, producing Vulcanaire jig grinding of large and small parts.

Send us a blue print on your toughest grinding problem. Recommendations and sketches will be returned to you — no obligation.



Horizontal application Gri
ing a Shoulder Punch.

Major Vulcan Services

Engineering, Processing, Designing and Building . . . Special Tools . . . Dies . . . Special Machines . . . Vulcamatic Transfer Machines . . . Automation . . . including the Vulcan Hydraulics that Form, Pierce, Assemble and size. Vulcanaire Jig Grinders . . . Motorized Rotary Tables . . . Plastic Tooling.

VULCAN TOOL CO. • 710 Highland Avenue • Dayton, Ohio

from interchangeable parts...

Danly Die Set Service is Faster!

One of the main reasons for Danly's faster die set service is the *interchangeability* of die set parts achieved by Danly. It starts at the main Danly Plant where die set components are produced to Danly's traditional high quality, precision standards. The faster service cycle continues at all of the Danly Branch Plants where thousands of *interchangeable* die set components are stocked. The cycle is completed at the Danly Branch in your area where these parts are assembled as a die set to meet your specific requirements and shipped as soon as your order is received. So remember—for the best in die sets in the shortest time, the place to call is your local Danly Branch.

hoose the Danly Branch closest to you—

UFFALO 7	1809 Elmwood Avenue
HICAGO 50	2100 S. Laramie Avenue
LEVELAND 14	1550 East 33rd Street
AYTON 7	3196 Delphos Avenue
ETROIT 16	1549 Temple Avenue
RAND RAPIDS	113 Michigan Street, N.W.
IDIANAPOLIS 4	5 West 10th Street
ONG ISLAND CITY 1	47-28 37th Street
OS ANGELES 54	Ducommun Metals & Supply Co., 4890 South Alameda
ILWAUKEE 2	111 E. Wisconsin Avenue
HILADELPHIA 40	511 W. Courtland Street
OCHESTER 6	33 Rutter Street
T. LOUIS 8	3740 Washington Blvd.
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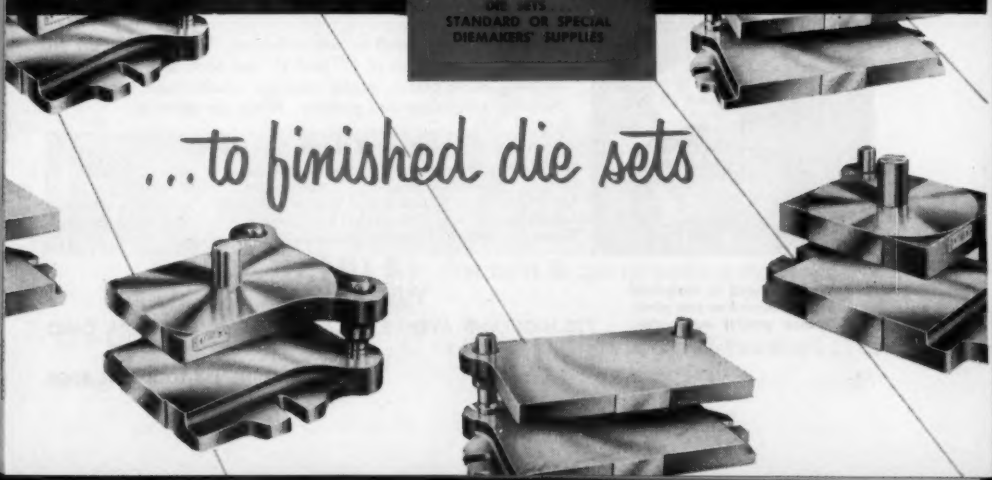
DANLY

DIE SETS
STANDARD OR SPECIAL
DIEMAKERS' SUPPLIES

DANLY MACHINE SPECIALTIES, INC.
2100 South Laramie Avenue
Chicago 50, Illinois



...to finished die sets

With Permanent Magnetic Chuck

NEW *Vulcan*

MOTORIZED ROTARY TABLE

for lapping and grinding

(not an index table)

With Lapping Plate

FASTER circular precision grinding!

Now with this table and with less effort you assure highest standards of accuracy, flatness, finish and close tolerances. At the same time you eliminate slow and complicated tool setups. You cut grinding time greatly by using only cross feed while the table is rotating at infinite speeds between 40 and 100 RPM.

Work clamped to motorized table, mounted on sine plate. Surface grinder application.

For example, Vulcan's Rotary Table can be used in connection with a sine plate or angle fixture. The dressing of large expensive external wheels for side grinding is therefore eliminated. If you wish we can provide permanent magnetic chucks designed for use with our table, both 6″ and 10″ in diameter.

Vulcan's Rotary Table is an air operated, self contained unit, portable between bench or machine. A precision center hole for locating and tapped holes in the table for clamping provides easy setup. Circular surface grinder applications are many and varied — grind flanged studs or bushings — bearing spacers — forming rolls — cutters — convex or concave surfaces — punches or dies (radius or angle).

Lapping? Yes — and in micro inches. For the 6″ and 10″ table, lapping plates of 12″ and 16″ are provided. Perfect for lapping valve plates, gages, bearing spacers and for carbide lapping using diamond powder. *Write for circular.*

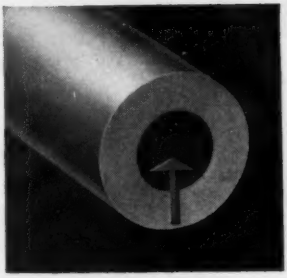
Major Vulcan Services

Engineering, Processing, Designing and Building . . . Special Tools . . . Dies . . . Special Machines . . . Vulcamatic Transfer Machines . . . Automation . . . including the Vulcan Hydraulics that Form, Pierce, Assemble and size. Vulcansire Jig Grinders . . . Motorized Rotary Tables . . . Plastic Tooling.

VULCAN TOOL CO.

720 HIGHLAND AVENUE • DAYTON, OHIO

a hole here means trouble . . .



a hole here saves trouble

Crucible Hollow Tool Steel Bars are a great trouble-saver for the metalworking industry. For they eliminate costly, time-consuming drilling, boring, cutting-off or rough-facing operations. And you save production time, machine capacity, and avoid scrap losses . . . for the hole is already in the steel you buy.

Crucible Hollow Tool Steel Bars are now available in any of our famous tool steel grades . . . in almost any combination of O.D. and I.D. sizes. And you get *immediate* delivery of five popular grades — KETOS oil-hardening, SANDERSON water-hardening, AIRDI 150 high-carbon high-chromium, AIRKOOL air-hardening, and NU DIE V hot-work tool steels.

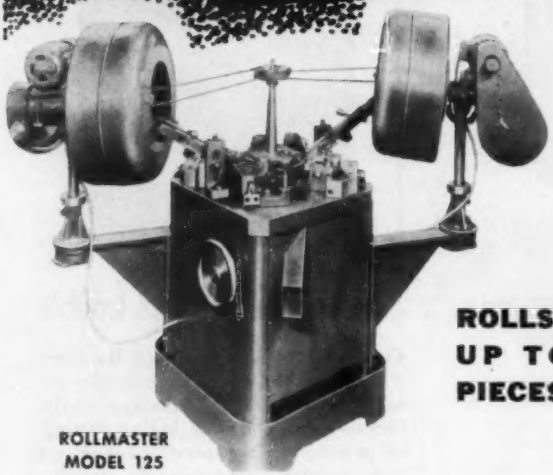
Let your Crucible representative show you how these easy-to-use Crucible Hollow Tool Steel Bars can save you time and money. *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 30, Pa.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

Prutton

PLANETARY ROLLMASTER



ROLLMASTER
MODEL 125

ROLLS THREADS UP TO 25,000 PIECES PER HR.

The high-volume hopper-feed roll-threading (up to 25,000 pc. per hr.) of Prutton Planetary Rollmasters, enables you to match thread rolling to header output with fewer machines, less manpower and at a lower operating cost. Actually, one Model 125 will handle the work of 2 hi-speed headers, a 300% gain for you over old-style reciprocating-action roll threaders.

Prutton's Rollmaster versatility will handle blanks from No. 4's to 1" diameter, up to 2" thread length.

- SAVE . . . 67% Man hours! One operator handles increased output of two Rollmasters.
- GAIN . . . Extra Die Life! Per-piece die life increased up to 7 times according to user information.
- EARN . . . Employee Goodwill! Sets new labor incentive standards with greatest production profits.

CLOSER TOLERANCE . . . VERSATILITY

(Write for Rollmaster Specifications)

Prutton Corporation

5295 WEST 130th ST. CLEVELAND 11, OHIO

CUTS GRINDING TIME MORE THAN HALF

LEMPCO STRAIGHTENING PRESS . . . STRAIGHTENS

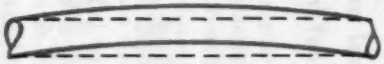
BARS, SHAFTS, RODS, "LONG WORK" for grinders or lathes; saves time in set-up, grinding or turning; saves metal.

EASY TO OPERATE

V-Block supports move anywhere along the channels to hold work at any point. Press mechanism (hydraulic) is suspended on rollers—moves along bed to apply controlled pressure *where you want it.*

LEMPCO PRODUCTS, INC.
INDUSTRIAL DIVISION
BEDFORD, OHIO

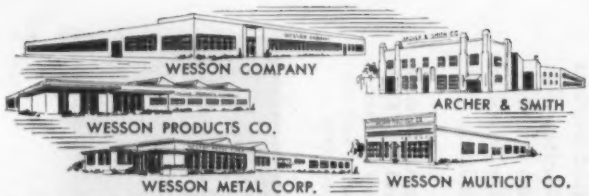
Write for descriptive literature and prices; here's a LOW-COST straightening press with heavy-duty capacity, simple and rugged yet fast and *accurate.*



DON'T

Grind that bent shaft! Straighten it first, in a few minutes; you'll save grinding time, take off less metal.

LEMPCO
for 35 years . . . a leading builder of machine tools.



carbide NEWS

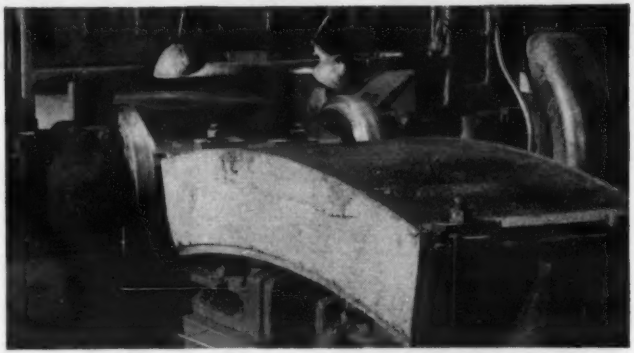
Output Jumps On Tough Job

Wessonmetal standard grades outperform all other tool materials tried on huge steel and cast iron tunnel segments

Typical of new performance records being reported for Wessonmetal carbides is the milling of 7-foot steel and cast iron segments for the new Lincoln tunnel addition using homemade 20-inch catheads.

High speed steel tools could not finish a single segment before burning up due to heavy sand inclusions. Other carbides also broke up or wore excessively. Part of the trouble resulted from the use of 28-year-old duplex millers for the machining operation.

When Wessonmetal grades "M" and



Giant tunnel segments being milled with Wessonmetal carbides. Two segments are milled per setup. Large sand inclusions are evident on side of rough casting.

designed for heavy shock applications.

Two segments are milled per setup, averaging 35 minutes. Machines are operated at a maximum speed of 110 sfm with a feed of 6 ipm on the steel seg-

Throw-Away Broach Teeth Give Four Carbide Edges, Eliminate Grinding

on the steel segments, and Grade 88, used on the cast iron segments, have inherently high wear resistance and are

⅞". The cutheads are equipped with 15 style BR Wesson lathe tools held in place by two set screws.

nounced by Wesson Company.

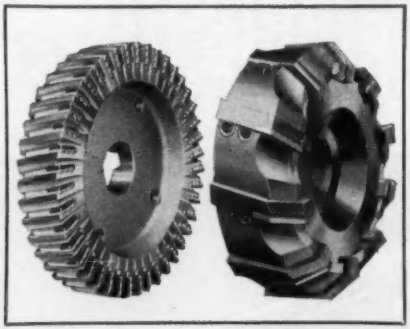
Seat for the carbide insert has a negative angle for maximum edge strength. The locking screw is flush with the top of the clamp, avoiding interference when loosening the lock holding the tool in broach bar.

New Rigidcuts Increase Economy, Milling Range

Two new Rigidcut inserted blade milling cutters, permitting higher feed rates and increased cutting depths are among recent Wesson Company developments.

Feeds of more than 100" per minute on cast iron finishing operations are now possible with the 7200 Series Rigidcut cutter. The new design, using over 4 blades per inch of diameter, eliminates one of the greatest obstacles to practical usage of high feeds on fine finishing operations.

Where a depth of cut up to ⅞" is needed on cast iron or steel, the new 3100 Series Rigidcut provides the necessary rigidity and strength because of its extra thick body. Special 1½" high Wessonmetal carbide tipped blades are locked in with Wesson Dual-Wedg locks. Rapid and accurate setup is assured by specially designed blade serrations.



Two newest cutters in Rigidcut line. Left to right: Cutter designed for high feed finishing; cutter for heavy duty cast iron and steel machining.

CARBIDE DATA

Additional information and specifications available:

☐ Specification data on new throw-away insert type broach tool design.

☐ Wesson Progress Report on boring.

Get data by writing to:
WESSON COMPANY, Dept. AD
1220 Woodward Heights Blvd.
Detroit 20, Michigan

tools Wesson carbide Wessonmetal

Reprint of Advertisement appearing in leading business publications.

Scully-Jones *precision built* Arbors and Adapters save costs two ways!

For fast, accurate milling at lower cost, it pays to use Scully-Jones *precision built* Arbors!

You save tool life because your cutters always run true, each tooth taking its share of the load. Arbor and pilot diameters are held to +.0000", —.0005". Faces of spacers and sleeves are ground and lapped parallel within .0002". Taper shanks are ground to a finish of from 10 to 20 micro-inches, RMS, and are individually checked on light gages to assure a perfect fit in the spindle.

You save tooling costs, too, because Scully-Jones Arbors are made to take a lot of punishment. Manufactured from steel forgings, they're tough on the inside to provide maximum strength and minimize vibration . . . hard on the outside to resist nicking and wear.

Call your factory-trained Scully-Jones representative or distributor for fast service on milling arbors, adapters, sleeves, spacing collars, and other Scully-Jones "Precision Holding" Tools.

Scully-Jones & Company
1907 So. Rockwell Street, Chicago 8, Illinois

SCULLY JONES

Let your factory-trained Scully-Jones representative or distributor help you select the right tool for the job.

SCULLY-JONES

"Precision Holding" for holding precision

Floating Holders | Adjustable Adapters | Safe-Torque Tap Drivers | Milling Machine Adapters | Close-Center Tap Drivers | Quick-Change Chucks | Heavy-Duty Tap Drivers | Drill and Tap Drivers | Recessing Tools

SET A STEADY *PACE*
FOR YOUR TOOLROOM with
OLIVER ACE
Universal Tool and Cutter Grinders

No "broken" production steps with the Oliver ACE. It reduces time lags to a minimum because its *simplicity of design and operation* makes economy of motion and fast grinding certain.

The Oliver ACE is so designed that only two simple fixtures are required for a general range of cutters. The ACE is especially built to handle a wider variety of cutter grinding and perform jobs for which ordinary cutter grinders are not designed. The ACE has only one sliding part with ample bearing efficiently protected from dust.

Always insuring lasting accuracy, the Oliver ACE handles the most difficult and the toughest grinding jobs . . . diamond-hard Tungsten-Carbide work and high speed milling cutters and tools are ground with ease. Easy to set-up, the precision built ACE requires no computation. Worker fatigue is greatly reduced because the Oliver ACE permits direct reading for clearance . . . no stoop . . . no squat . . . no squint.

Time proved and soundly engineered, the ACE economizes on floor space . . . saves valuable time . . . gives you guaranteed precision. It substantiates Oliver of Adrian's world-wide reputation as a superior designer and builder of lasting . . . more accurate machine tools.

Priced to meet your budget, the ACE excels for grinding face mills up to 15"—also, slab mills • slitting saws • dovetail cutters • angular cutters • double angle cutters • Fellows helical cutters • reamers • taper reamers • production gashing and carbide tipped circular wood saws.

2 MODELS: Standard and Heavy Duty (illustrated)

Write Today for Complete Data

See our Catalog in Sweet's Directory

OLIVER INSTRUMENT CO.

1408 E. MAUMEE • ADRIAN, MICHIGAN

MACHINE TOOLS by OLIVER include:
AUTOMATIC DRILL GRINDERS
TOOL & CUTTER GRINDERS
DRILL POINT THINNERS
TEMPLATE TOOL GRINDERS
FACE MILL GRINDERS
DIE MAKING MACHINES

SUPERIOR "Removable Cap" GUIDE PINS

End Troublesome Binding In Die Set Assembly Work . . .

Cut away view of NEW Superior Removable Guide Pin shows its practical construction.

HEXAGON KEY REMOVES CAPS TO FREE PUNCH HOLDER . . . DIES PART QUICKLY and EASILY

It is no longer necessary to spend excessive time in assembling and disassembling large die sets! Superior's *NEW* Removable Cap Guide Pins eliminate punch holder binding on guide posts when parting dies. The cap is removed from the pin merely by loosening a socket head screw which holds the cap in place. This frees the punch holder at the most critical point of the pin where it is apt to cock or bind. Instead of needing 2 or 3 die makers to remove the punch holder from a set, one man can easily do this work alone in a few minutes. As a result overall die costs are substantially reduced. Complete information is available on request. Save by using these advance type guide pins in your die sets. Write, phone or wire your needs now!

For Fast Local Service Call These Expert Superior Representatives

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Indianapolis, Ind.—BRoadway 5668
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St. Paul, Minn.—PRior 6485
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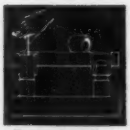
Boston, Mass.—HUbbard 2-3373



Removing Cap

Parting Die Set

Replacing Die Set

SUPERIOR STEEL PRODUCTS CORP.
2754 S. 19th ST., MILWAUKEE, WIS.

NEW
Rotor B-35 Vertical Air Grinder
PAYS FOR ITSELF IN 14 WEEKS

Job: Grinding surface defects on castings. Formerly used 3600 rpm electric grinders.

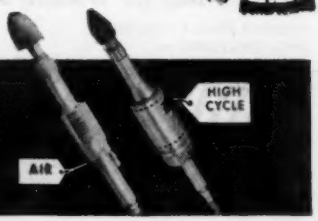
Now: Rotor Application Engineer suggested switching to new Rotor B-35 Vertical Grinder at 6000 rpm with a harder wheel.

Results: Saves 8 minutes per casting . . . 40% more output with 60% use factor. Savings paid off tool in 14 weeks. Wheels last longer. Cuts operator fatigue.

See how *you* can step up output with new Rotor tools! Ask for demonstration on your job.

ASK FOR CATALOG No. 40

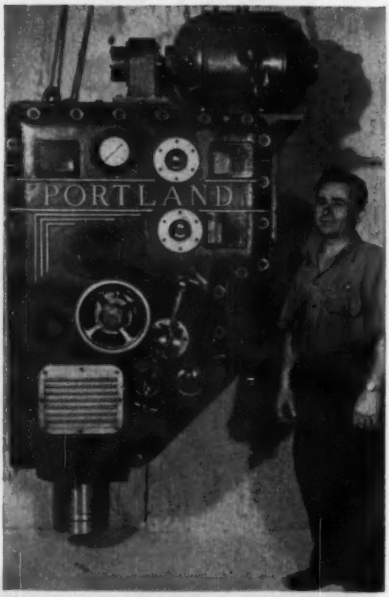
THE ROTOR TOOL CO.
CLEVELAND, OHIO



CONVERT

YOUR OUTMODED PLANERS INTO POWERFUL, MODERN PLANER-TYPE MILLING MACHINES

With → **PORTLAND'S HEAVY DUTY MILLING HEAD**



The Portland Heavy Duty Milling Head can be used to convert your planer to a modern high-production planer type milling machine.

Standard Heads are provided with 22 speeds in geometrical progression from 20 to 1000 r.p.m.

High speed Heads available up to 10,000 r.p.m.

Infinitely variable hydraulic feed from 0" to 60" per minute enables a fine adjustment of cutting rate for maximum efficiency.

Heads are available 10 to 100 HP.

Quill sizes—7½" to 20".

For that difficult problem in metal machining, avail yourself of PORTLAND engineering.

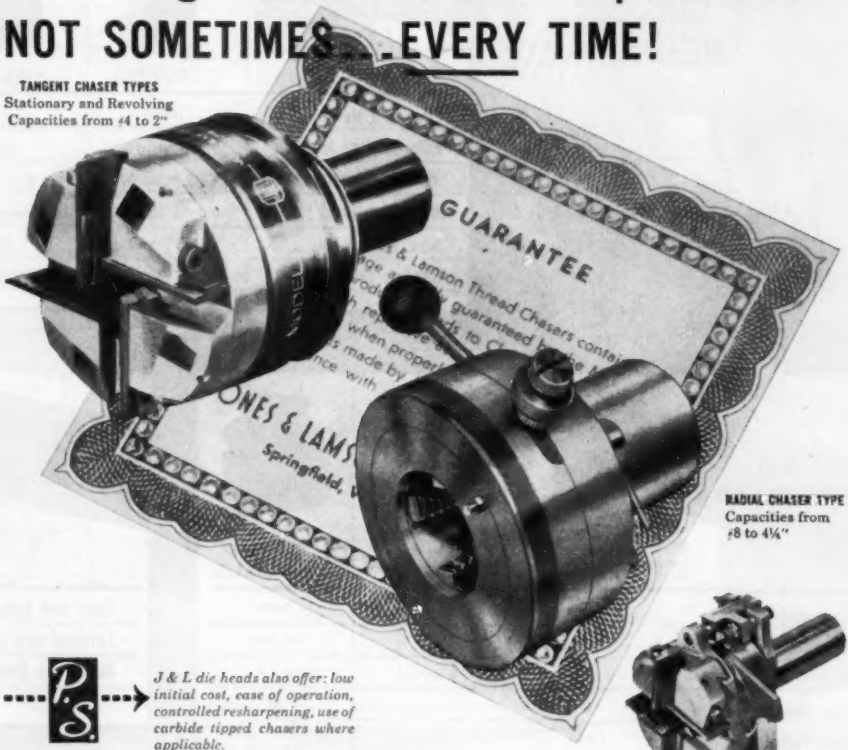
For further details send for brochure BB.

PORTLAND MACHINE TOOL WORKS, INC.

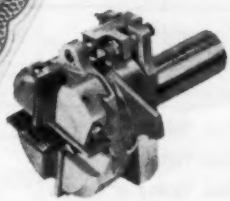
East of Broadway, South Portland, Maine • Tel. 3-9231

Jones & Lamson dies are your best buy . . . whether you need Class III or not. They give you extra savings because of our system of "no approximation" . . . a factor that also applies to Class I and II. So, whatever your requirements, Jones & Lamson's *written* Class III or better Guarantee means - - - - - **IMPORTANT SAVINGS regardless of tolerance requirements — NOT SOMETIMES . . . EVERY TIME!**

TANGENT CHASER TYPES
Stationary and Revolving
Capacities from #4 to 2"



RADIAL CHASER TYPE
Capacities from #8 to 4¼"



FOR BROWN & SHARPE AUTOMATICS and SMALL TURRET LATHES
Capacities from #0 to 1¼"

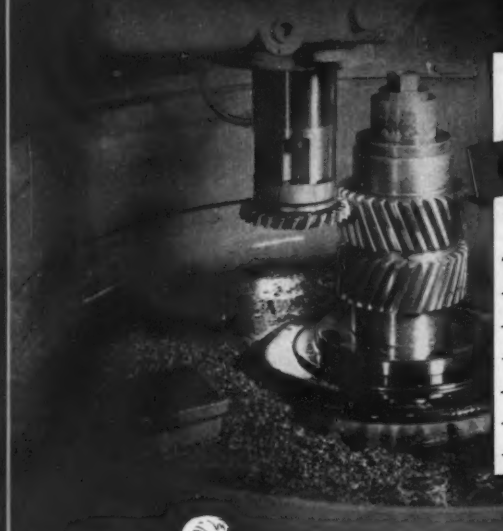
P.S. *J & L die heads also offer: low initial cost, ease of operation, controlled resharpening, use of carbide tipped chasers where applicable.*

JONES & LAMSON

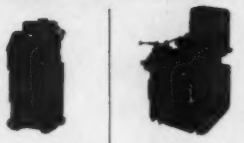
Machine Tool Craftsmen Since 1835

JONES & LAMSON MACHINE CO. 520 Clinton St., Dept. 710, Springfield, Vt., U.S.A. J&L THREAD TOOL DIV.

THE FELLOWS METHOD . . . Machines a



	FROM 1/16" TO.....	
	3" FINE-PITCH	TYPE 4GS
Spur and Helical	both	both
External and Internal	yes	yes
Max. Pitch Diameter	3 inches	6 inches
Max. Diametral Pitch	40 Steel, 30 Brass	5/7 spur, 6 h
Max. Face Width	3/4" ext.	2"
Strokes per Min. Max.	2000	635



	No. 4 FINE PITCH	No. 8 "FULL-TOOL"	No. 11 INTERNAL
Spur and Helical	both	both	both
External and Internal	Ext. only	yes	Int. only
Max. Pitch Diameter	4 inches	8 inches	* * *
Max. Diametral Pitch	20	4	6
Max. Face Width	1 inch	2 1/2 inches	1 1/2" up to 10p 1" 12 to 16p
Max. Spread of Centers	12 inches	* *	—

Also 12", 18" and 24" machines for externals only

Spur and Helical
External and Interr
Max. Pitch Diamete

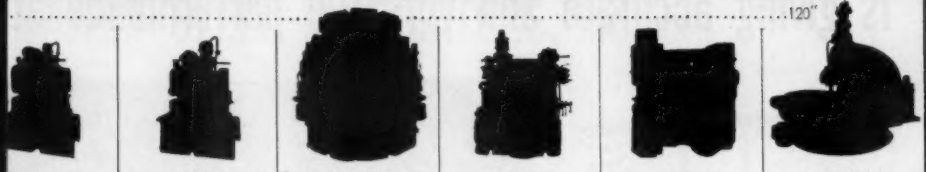
**Depends upon work-holding fixture ***Depends upon design of gear

THE Fellow

Head Office

Branch Offices: 323 Fisher Bldg., Detroit 2, Michi

Tools for Precision Gear Production



7-TYPE*	7A-TYPE	No. 10 ROTARY	6A-TYPE	36-TYPE	120-INCH
both	both	both	both	both	both
yes	yes	yes	yes	yes	yes
pur, 6 1/2" hel.	7" spur, 7" hel.	12 inches	18 inches	36 inches	120 inches
spur, 6/8 hel.	5/7 spur, 6 hel.	3/4 spur, 5/7 hel.	3/4 spur, 5/7 hel.	3 spur, 4/5 hel.	2 spur, 4 hel.
2" ext., 1" int.	2" ext., 2" int.	3" ext., 3" int.	5" ext., 3" int.	6" ext., 6" int.	8" ext., 8" int.
450	450	500	300	300	148

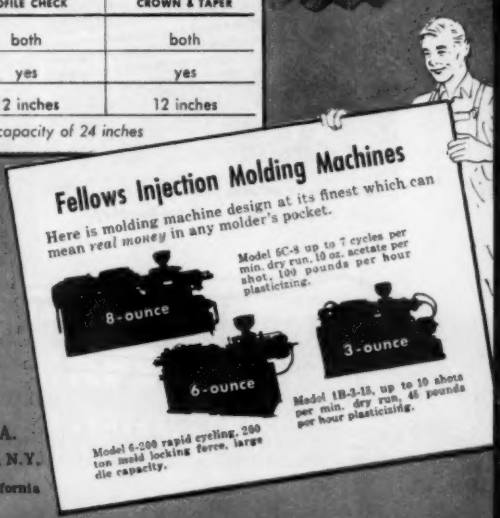
*Max. P. D. internal—5 1/2"

4 Fine-Pitch RED LINER	No. 8M RED LINER	No. 20M RED LINER	No. 12M Involute MEASURING INVOLUTE PROFILE CHECK	No. 12H LEAD MEASURING CHECKING LEAD CROWN & TAPER
FOR COMPOSITE CHECK				
both	both	both	both	both
yes	yes	yes	yes	yes
4 inches	***	18 inches	12 inches	12 inches

Nos. 24M Involute and 24H Lead Measuring Instruments with capacity of 24 inches

***Depends upon design of gear

Ask for Literature, available on all of the standard equipment shown above. In addition Fellows builds many special-purpose machines for production of gears and allied devices. A Fellows Representative will be glad to counsel with you on your particular problem. Get in touch with the nearest Fellows office.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Here is molding machine design at its finest which can mean *real money* in any molder's pocket.
Model 6C-8 up to 7 cycles per min. dry run, 10 oz. acetate per shot, 100 pounds per hour plasticizing.
8-ounce
3-ounce
6-ounce
Model 1B-3-18, up to 10 shots per min. dry run, 45 pounds per hour plasticizing.
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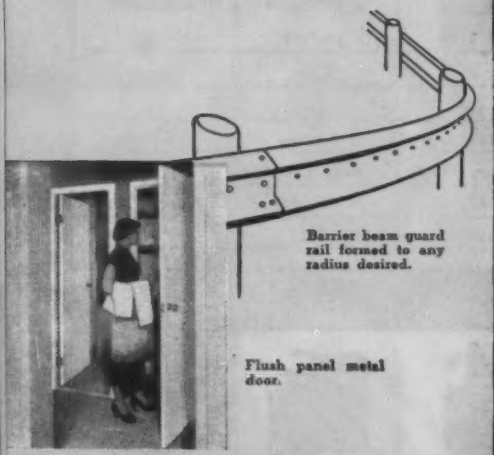
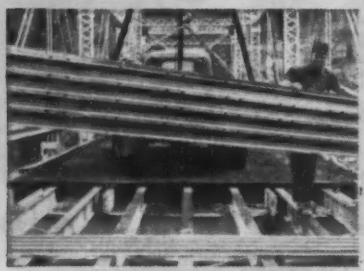
this CINCINNATI

is giving accurate and versatile performance at

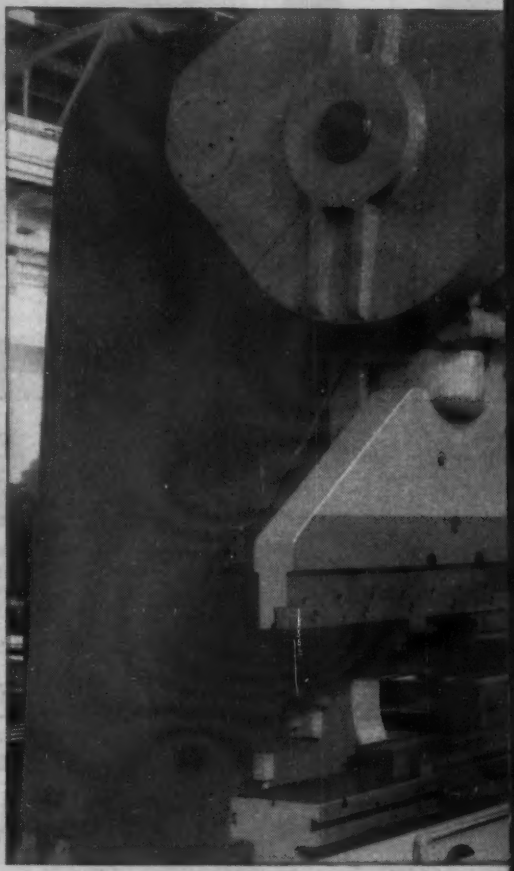


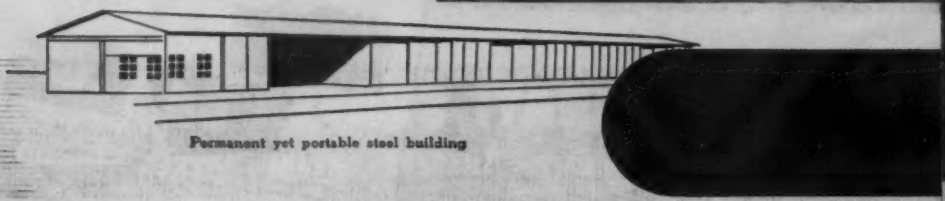
Barrier beam guard rail formed to any radius desired.

Flush panel metal door.



Formed structural bridge flooring



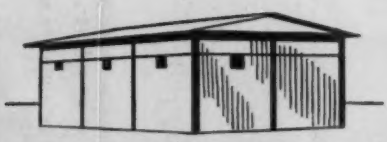


Permanent yet portable steel building

PRESS BRAKE

UNITED STEEL FABRICATORS, Inc.

Photos courtesy of United Steel Fabricators, Inc., Wooster, Ohio



All steel buildings of a thousand uses

WITH ample capacity, this powerful 500 Series Cincinnati Press Brake with 18′ 6″ clearance between housings and 22″ die area—handles formed structural bridge flooring, guard rails, steel doors. Girders and side walls for various types of metal buildings are also produced. United Steel Fabricators, Inc. are pleased with the accuracy in forming and ease and speed of operation which are important factors in this economical production.

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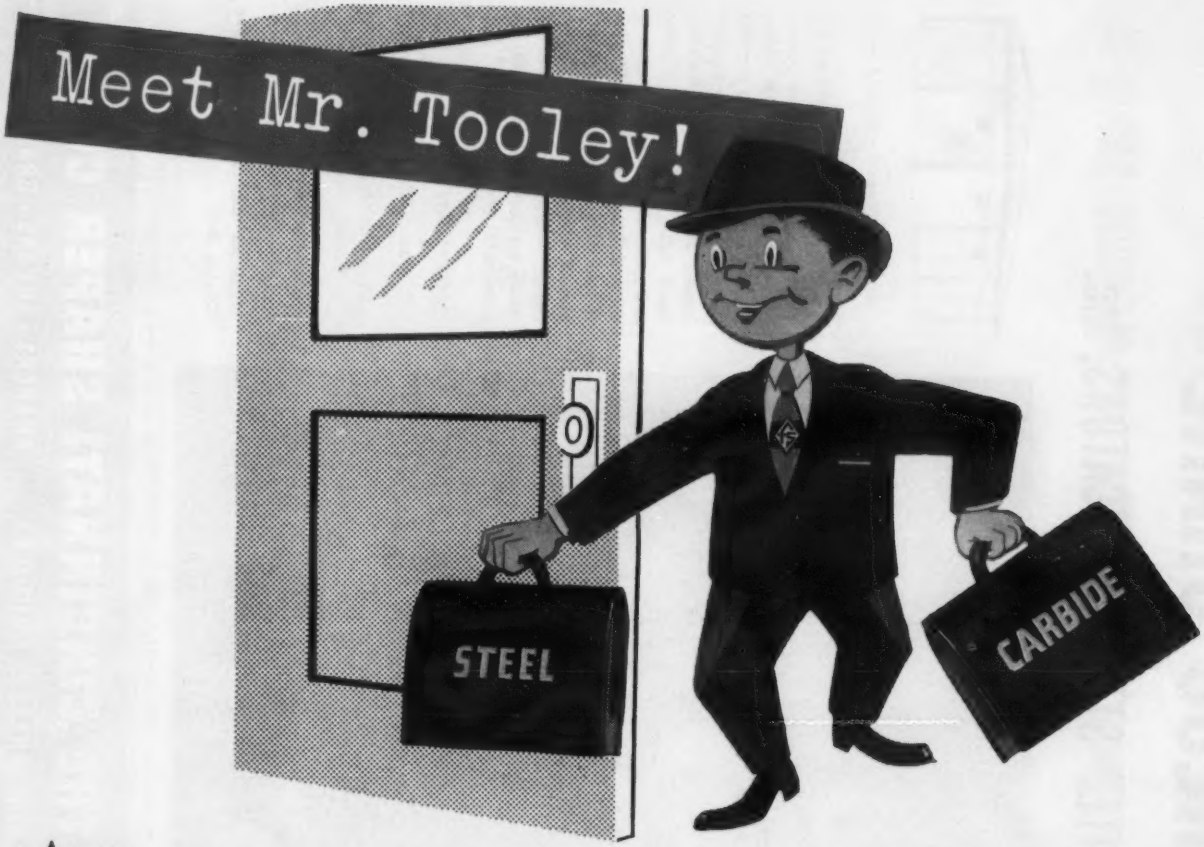

AMERICA is a land of symbols. The things we use and

on America's breakfast table, to Reddy Kilowatt who dramatizes electricity . . . "trade" symbols and characters have become loved and respected as representing reliability, versatility and often uniqueness.

Our Mr. Tooley is such a *symbol* to all industry where tooling for production is so important that it may even mean the difference between profit and loss.

For Mr. Tooley typifies the *unique* position that Firth Sterling occupies among producers of tools and tooling materials . . . that of making and selling *both steels and carbides* . . . the *right* steel or carbide or the exact combination needed to do each job best . . . from a single manufacturing source.

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Ask your distributor about these "big wheels" in new, time saving *stock grains and textures* "matched" for jobs where savings count most.

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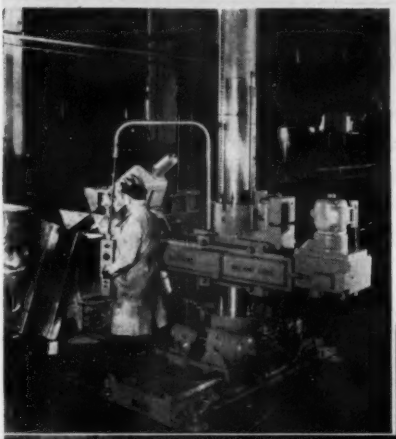
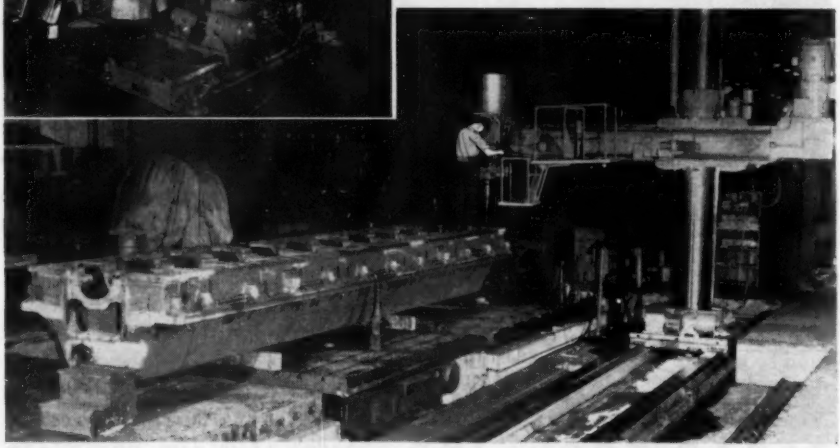
Kaukauna At Work....

UNIVERSAL RADIAL DRILLING MACHINES



Drilling angular holes in bore of casting is a job that requires accuracy, fast tool positioning and plenty of power to take full advantage of the highest feeds and speeds permissible with modern cutting tools. Kaukauna Universal Radial Drills have the power, accuracy and stamina to do this work quickly, easily and at low cost. A versatile line of machines with simplified controls, they maintain efficient high production on large, unwieldly workpieces or small production parts, and perform drilling, reaming, boring, counterboring, tapping and spot-facing operations. They do jobs that no other machines can do . . . save time and money.



With extended column, runway and reach, this Kaukauna Universal Radial Drilling Machine is saving set-up time by drilling, tapping, driving studs and spot-facing with speed and accuracy from any angle on diesel engine bases and blocks.

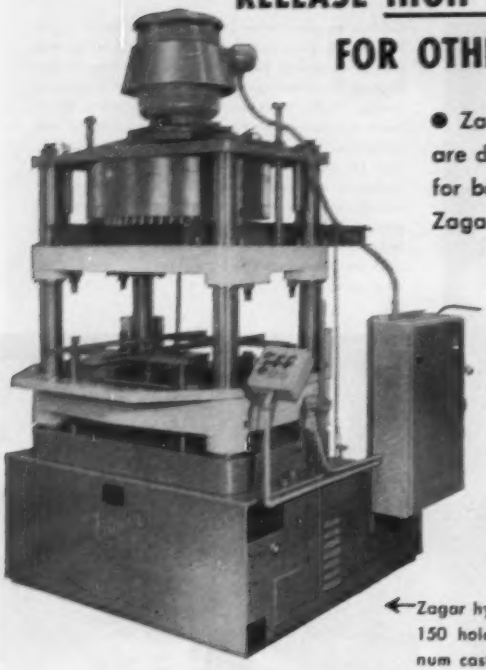
Kaukauna builds Universal Radial Drills and Horizontal Drilling Machines in a range of sizes which meet practically all requirements in modern production practice. Write today for descriptive catalog or ask representative to call.

KMC Kaukauna MACHINE CORPORATION

KAUKAUNA, WISCONSIN, U. S. A.

Zagar 4-POST RAM TYPE DRILLING MACHINES

RELEASE HIGH COST DRILL PRESSES FOR OTHER IMPORTANT JOBS



● Zagar hydraulic drilling machines are designed for high speed drilling—for both production and limited runs. Zagar 4-post machines reduce high cost tooling, and handle a range of work that ordinarily necessitates the use of *several different machines*. Very important, Zagar drilling machines release capital equipment for other purposes. Zagar 4-post machines lower your capital investment. They quickly pay out. What, sir, are your production requirements?

←Zagar hydraulic ram-type 4-post machine drills 150 holes, 5/16" through ⅝" dia. in aluminum casting at one pass.

Get Zagar's Engineering Manual "B-2" for details on all sizes of 4-post drilling machines.

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Zagar

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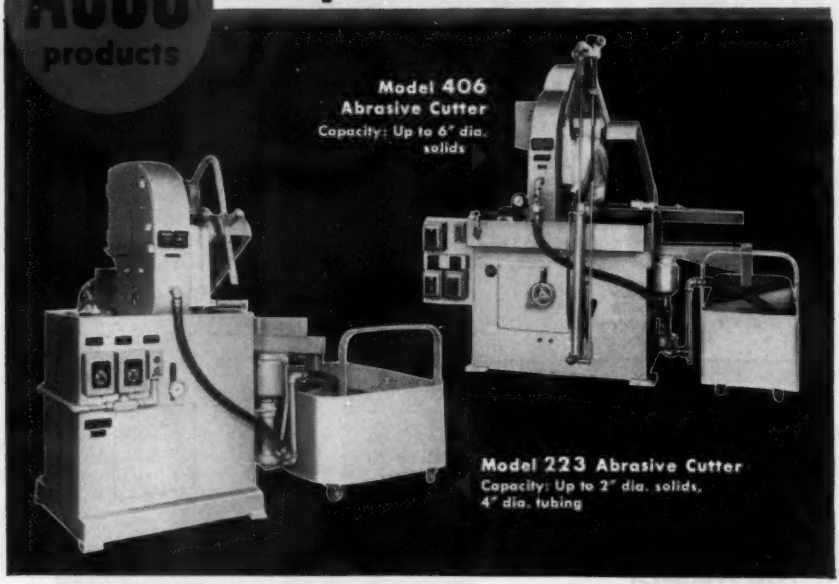
ACCO products

Campbell Abrasive Cutters



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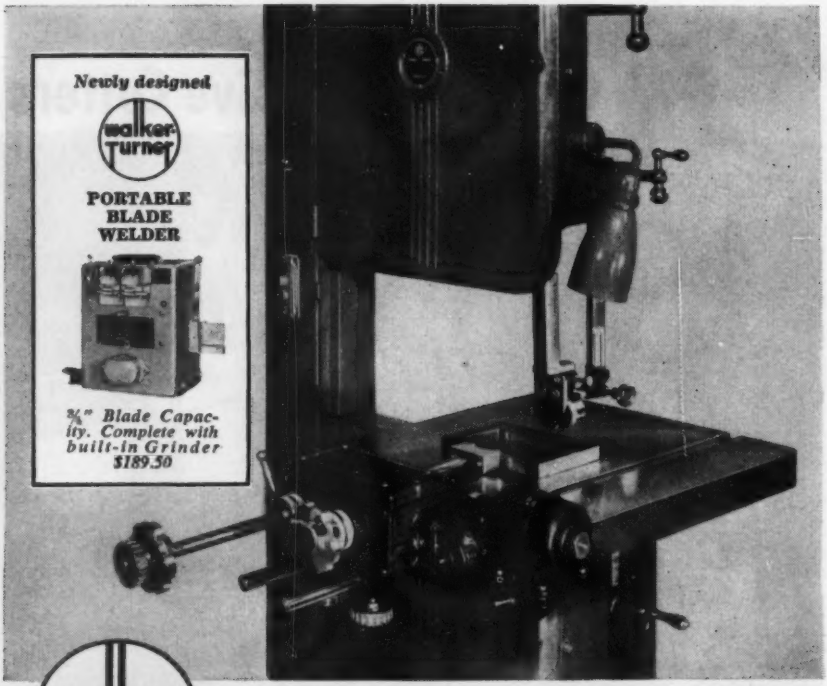
Wet and Dry Cutters and Nibblers



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The Variable Speed Drive on this LIGHT-HEAVYWEIGHT 16" Band Saw adjusts to the exact speed for any stock you work: tough steel . . . non-ferrous metals . . . plastics . . . laminates . . . compositions.

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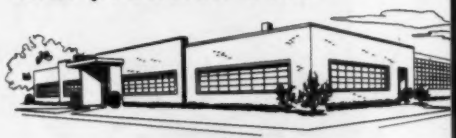

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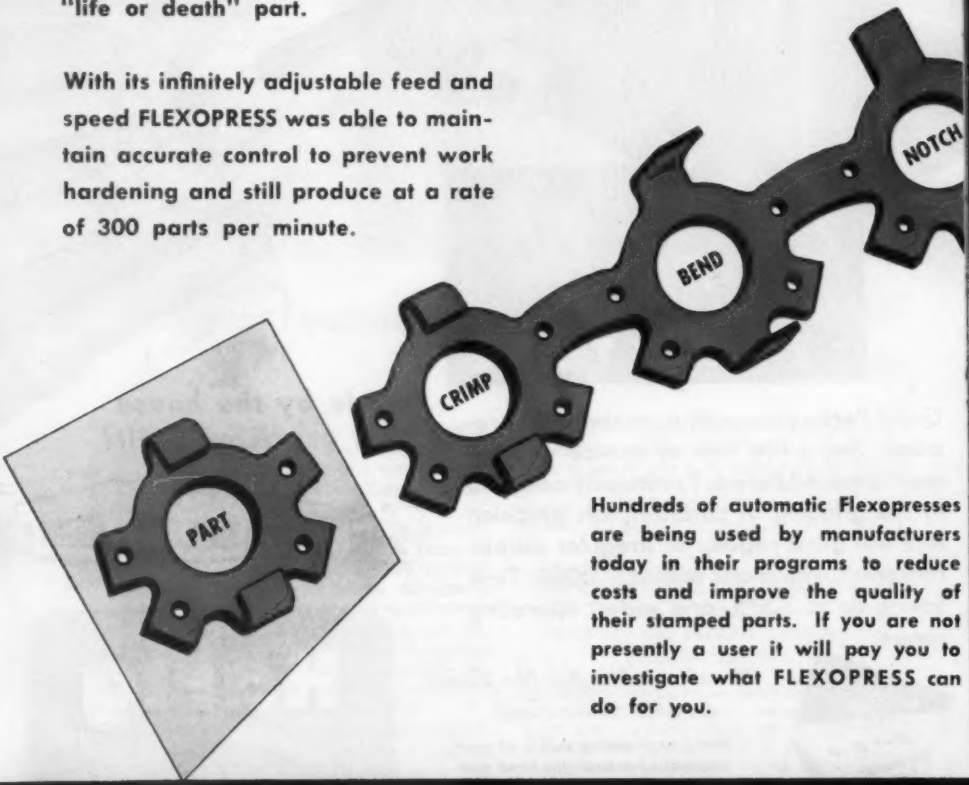

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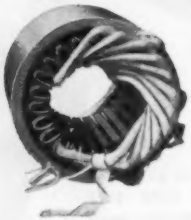

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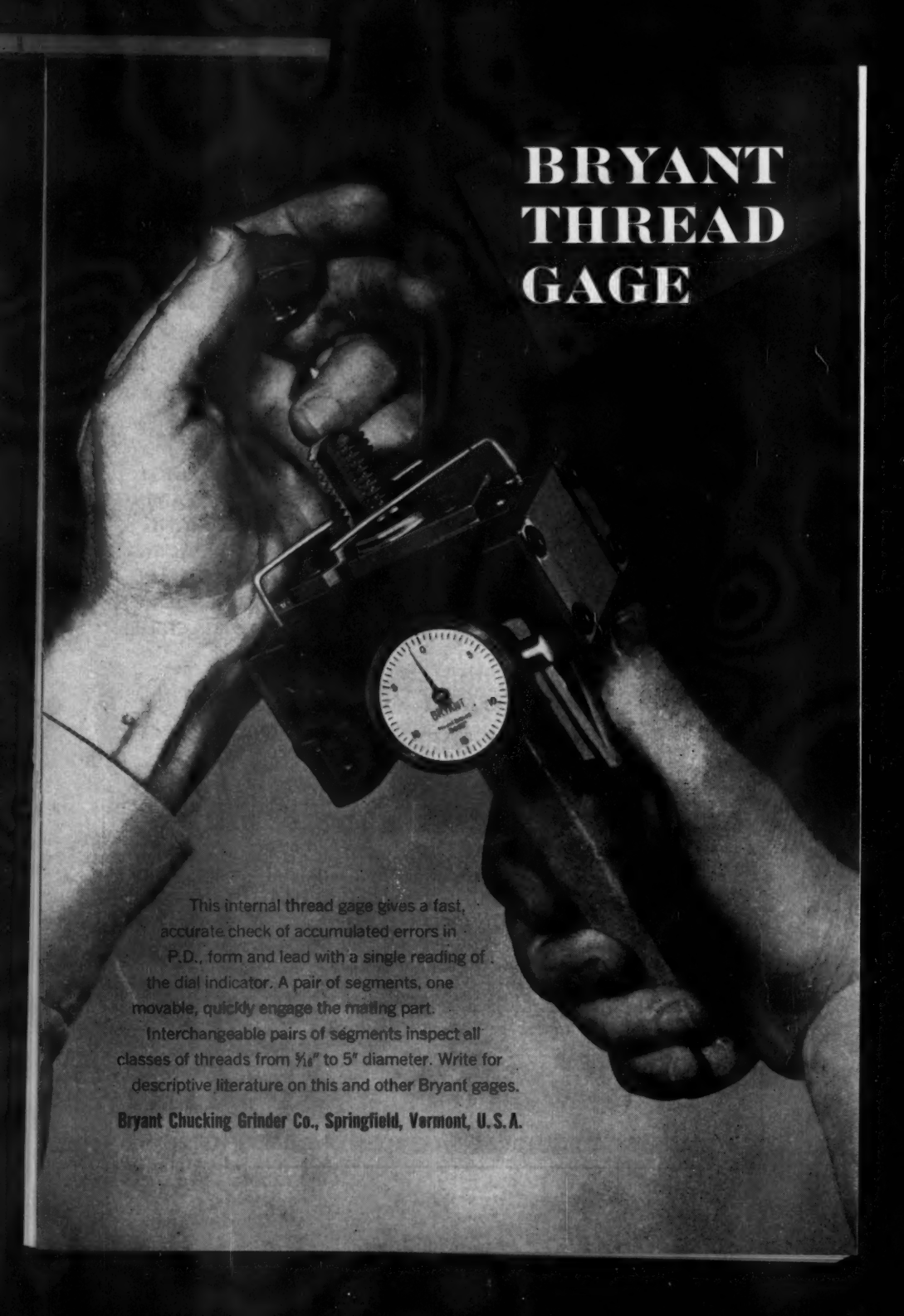
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THREADING... REAMING...
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AIR ACTUATED HYDRAULIC FEED
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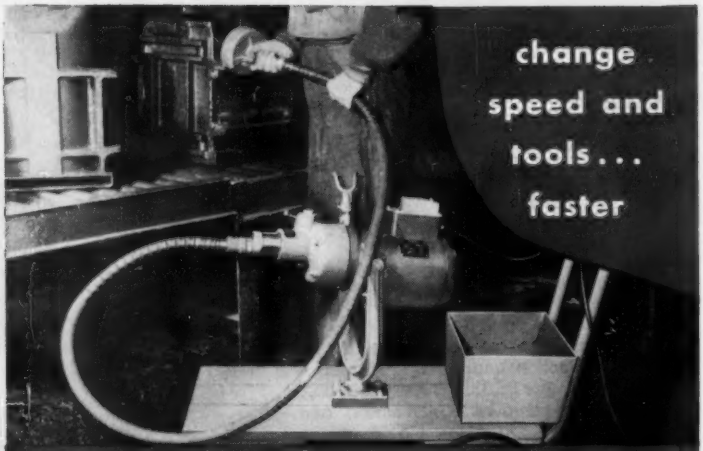
MONTPELIER, OHIO



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HIGH SPEED STEEL SAWS provide the ultimate in cutting life on all types of non-ferrous alloys, but won't take as much abuse as Si-Maloy Saws. Furnished clearance ground in a wide range of stock sizes. Simonds Steel, modern heat-treating, grinding and production methods insure longer, trouble-free service from every saw with the familiar Simonds ribbon trade mark. Write for Bulletin M-80 for further information.

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You, too, can

SPEED UP

METAL-CUTTING JOBS

Like This Famous Industrial Plant Does

Report From
Allis-Chalmers Manufacturing Co. Milwaukee Plant

Machine
Kling Friction Saw

Jobs Performed
Cutting channels, angles, round, square and flat bar stock.

Average Cuts Per Day
1000 to 1300 per 8 hours

What Does It Replace?
Kling Friction Saw in use from January 1928 to July 1953.

Kling HIGH SPEED FRICTION SAWS

cut cutting-time **IN THE "BEST OF COMPANIES!"***

Can you cut 24" 100 lb. I-Beams in 28 seconds...15" 55 lb. Channels in 15 seconds...8" x 8" x ¾" Angles in 11 seconds? These are only a few examples of what the Kling High-Speed Friction Saw is doing daily in many of the country's most important metal working plants. No wonder Kling Machines are attracting "top-level" attention!

Friction Sawing works differently—cuts metal by generating heat through friction, on to the part to be cut, at a rate faster than the part can absorb heat. Kling Friction Saws cut all types of steel, hard or soft, large or small, in any shape, without distortion, and without change of blade or set-up.

The average Kling Friction Saw blade will give a full day's production before requiring redressing, thus eliminating costly downtime and saving on tool costs.

* *The following are some of the companies using Kling Machines:*
American Brake Shoe Co. Bethlehem Steel Co. Inc. Carrier Corporation International Harvester Co. Jones and Laughlin Steel Corp. Kaiser Steel Corp. Link-Belt Co. Madsen Iron Works, Inc. Maryland Dry Dock Corp. Shell Oil Co. Wabash Railroad Co. Westinghouse Electric Corp.

Complete Friction Sawing Information FREE! Write for 12-page Bulletin No. 9200 that tells you in detail, exactly how Friction Saws work and what they can do in your shop to save you time and money.

KLING BROS. ENGINEERING WORKS • 1320 North Kostner Avenue, Chicago 51, Illinois

Export Distributor: Simmons Machine Tool Corp., 50 East 42nd St., New York 17, N. Y.

473MMRR

Since 1892 **Kling**

...an investment in speed!

Combination Shear Punch & Copers

Double Angle Shears

Punches

Plate Bending Rolls

Here's The Way To Get Production Up!

Everyone in industry wants production *up* . . . and tool costs *down*. It is simply good business. A good way to do this is to always be certain you are using tools with real "cutting-mileage" built into them. Chicago-Latrobe Reamers are these kind of tools.

Our files contain an almost unlimited number of testimonials from production people of the important industries. There is one point of similarity in the letters... they all say, in one way or another, "we never fail to get increased production from our machines when we use Chicago-Latrobe cutting tools." You can experience the same results . . . try them and see.

CHICAGO-LATROBE

Double-Circle Reamers

Better Service, too!

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DOUBLE CIRCLE TOOLS

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418 WEST ONTARIO STREET • CHICAGO 10

• DRILLS • COUNTERSINKS • CARBIDE TOOLS
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Chicago RIVET "912"

AUTOMATIC RIVET SETTER CUTS COSTS 3 WAYS

1 FASTENS FASTER . . .
Only the speed of the operator limits the 912's riveting speed. Completely automatic. A push on the foot pedal automatically feeds, inserts and clinches the rivet.

2 DOES WORK OF SEVERAL MACHINES
Quick change rotary hopper and raceway makes the 912 adjustable in 5 to 10 minutes to set different size rivets. Adjustable anvil height and 12-inch throat provide further versatility.

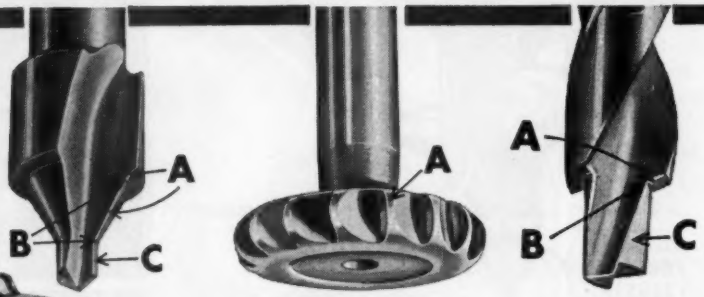
3 SAVES ON MAINTENANCE . . .
The 912 is massively built to stand the shocks of constant use and is designed for quick, easy servicing and parts replacement.

If your assembly calls for 3/16" steel tubular rivets or smaller, of 15/16" lengths or less, ask us to show you how the 912 can cut your fastening costs. Send a sample of your problem assembly (or blueprint) for a free fastening analysis.

FREE CATALOG
contains valuable engineering information and rivet specifications plus illustrated descriptions of 26 Chicago Automatic Rivet Setters.

Chicago Rivet & MACHINE CO.
9610 West Jackson Boulevard, Bellwood (Chicago Suburb) Illinois
***Branch Factory:* Tyrone, Pa.**

"RO" Form Relief means longer life for cutting tools because it leaves supporting metal behind the cutting edge



A Sharpens these cutting edges with any degree of form relief.

B No undercutting at intersection — no burr on work piece.

C Diameters can be cylindrically ground or relieved as desired.

There is a constant increase in the number of shops bringing their tool grinding practices up to date by standardizing on form relief sharpening as a means of reducing tool costs. No other fixture offers the ease of set-up and operation and the flexibility of the "RO" Universal Form Relieving Fixture.

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GRINDER DIVISION
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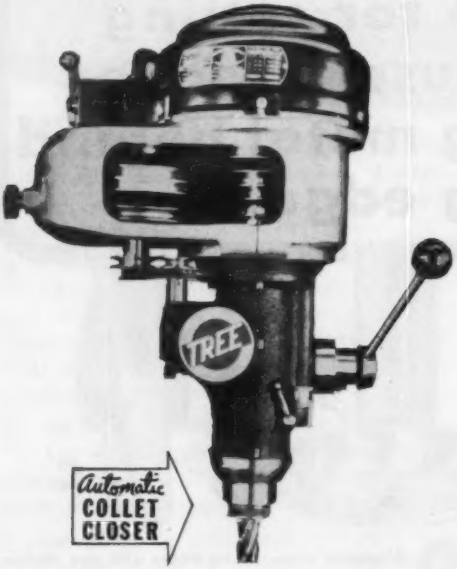
VERTICAL MILLING CAPACITY?



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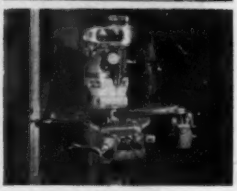
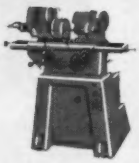


You can add vertical milling capacity by adapting the versatile TREE MH-4 Vertical Milling Attachment to your present horizontal milling machine. The MH-4 gives you all angle milling, drilling and boring with a high degree of accuracy because of its built-in rigidity. Spindle — alloy steel, hardened and ground Roller drive eliminates back-lash. Quill — 4 inch travel. Enclosed micrometer depth stop. Power feed. Write today for full information.

EXPORT ADDRESS: States Trading Co., 401 Brdwy., New York 13, Cable Address; "STRADESO"

TREE TOOL AND DIE WORKS

1600 JUNCTION AVENUE RACINE, WISCONSIN



This small hole grinder mounts interchangeable wheelheads for internal and external spindles. Hole capacity is 3" dia. with a maximum depth of 4"; external is to 3" dia. by a 4" length. Collets and step chucks mount directly in lathe-type spindle.

This flexibility combined with the inherent accuracy is why the Rivett 84 has gained great popularity in toolrooms since its introduction to the trade twelve months ago.

Quick and easy to set up, the 84 will handle your diversified jobs faster, too. All the details to prove this are shown in Catalog No. 84-A. **Write for a copy today!**

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Foremost Manufacturer of Rapid Production Equipment For

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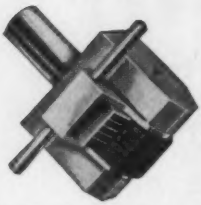

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Noblewest rapid production dial feed marking machines represent the ultimate in modern marking equipment.

Let the world's leading manufacturer of rapid production metal marking equipment help you to mark your products faster, better, at lower cost. Noblewest originated the Roll-Marking Process in which the inscription is permanently rolled in—lasts as long as the product itself. Noblewest marking dies, automatic numbering heads, and general purpose marking equipment are equally well-known for their unfailing service to industry. The Noble & Westbrook Mfg. Co., 9 Westbrook St., East Hartford 8, Conn.

SINCE 1906

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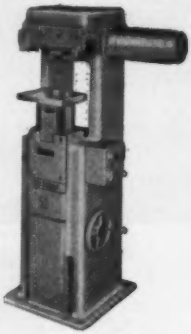

The new Roll-O-Mark with all-pneumatic operation. Finest of all medium priced general purpose marking machines.

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NOBLEWEST

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Reduce Tool Costs!

Cross Tool Control Unit Automatically Stops Machine When Tools Need Changing

The Cross Tool Control Unit reduces tool costs, decreases machine downtime. Available in four different sizes, it can be used with most types of metalworking equipment.

Here's what it does:

- ★ **Provides continuous picture of used and unused tool life and establishes performance standards.**
- ★ **Decreases downtime by permitting tool changing in groups.**
- ★ **Reduces scrap by stopping machine before tools lose size.**
- ★ **Reduces tool grinding costs.**

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THE CROSS CO.

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Special MACHINE TOOLS

Model 111 Base Mounting

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DRILL UNIT

BY ELECTRO-MECHANO CO.

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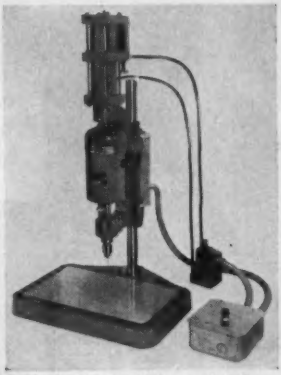

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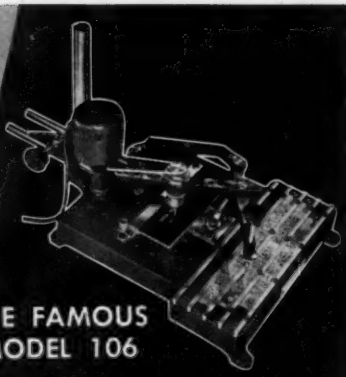

THE FAMOUS
MODEL 106

The three-dimensional bench Model 106 cuts costs — engraves, routs, models and profiles, giving you expert results even by unskilled workers.

THE NEW
HEAVY-DUTY
MODEL D-2

The Model D-2 heavy-duty, two dimensional Pantograph is a precision machine with a multitude of new features. Open on three sides, it permits complete freedom for engraving, milling, profiling large panels (up to 30" in diameter) or bulky pieces. Single, micrometer adjustment controls vertical depth of cut, automatically adjusting copy table with pantograph. Range of reduction ratios from 2-to-1 to infinity! Vertical range over 10 inches!

For complete information, write to

GREEN INSTRUMENT COMPANY

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<u>without</u> draining away your capital!

Take advantage of the Norton

Grinding Machine Lease Program

for low-cost leasing of new Norton grinders and lappers

Naturally, you want to meet competition on at least equal terms — with the latest and best in modern grinding equipment.

Yet, like so many other manufacturers, you may want to conserve your working capital — and the cost of replacing inefficient producers is delaying, if not prohibiting your modernization.

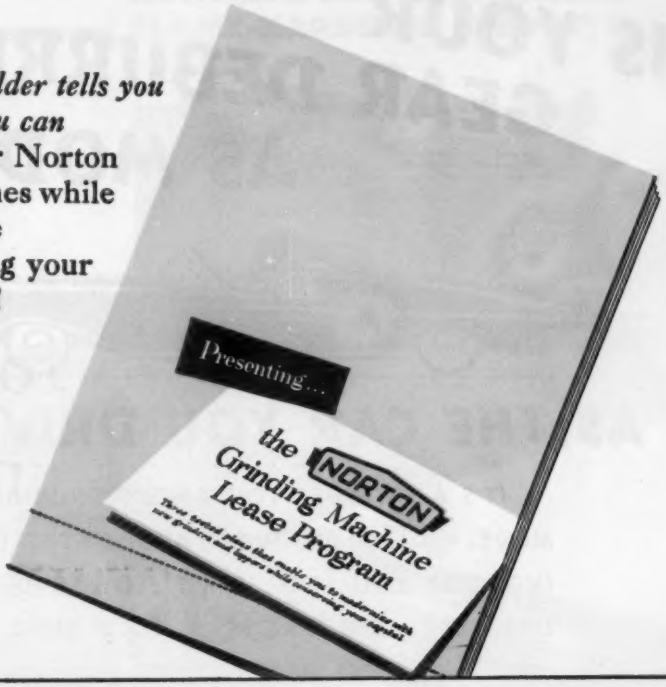
What's the answer?

The answer is the Norton Grinding Machine Lease Program, developed to help manufacturers secure the grinders and lappers they need for modernization — without weakening their financial position.

The new Norton Program gives you three separate plans for leasing new Norton grinders and lappers, with nominal payments extending over a seven-year period. Each plan meets specific requirements. Each plan is extremely flexible, providing for early termination of the lease, or purchase of the equipment, at your option.

One of these plans may help pave the way to better business for you. Don't miss getting complete facts on them — send in the coupon!

This folder tells you how you can **pay for Norton machines while they're building your profits!**



Under the Norton Grinding Machine Lease Program a comprehensive selection of the most popular types and sizes of machines is now available to you, under low-cost, flexible leasing arrangements.

This folder describes the Program, giving details of the three different plans by which you can improve your competitive position and profits. Send for it now — and remember: only Norton brings you such long experience in both grinding machines and grinding wheels to help you produce more at lower cost.

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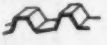
AS THE CAR YOU DRIVE?

IT'S A SAFE BET YOU AREN'T DRIVING A 1925 MODEL BUT WHAT ABOUT GEAR DEBURRING? ARE YOU STILL USING SLOW AND COSTLY, OBSOLETE METHODS TO DEBURR GEARS?

WHY NOT DEBURR AND CHAMFER THE ENTIRE TOOTH FORM  AUTOMATICALLY AT HIGH PRODUCTION RATES ON A MODERN BURR-MASTER? EITHER SPUR OR HELICALS; EXTERNAL OR INTERNAL; SPLINES TOO . . .

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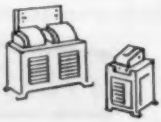

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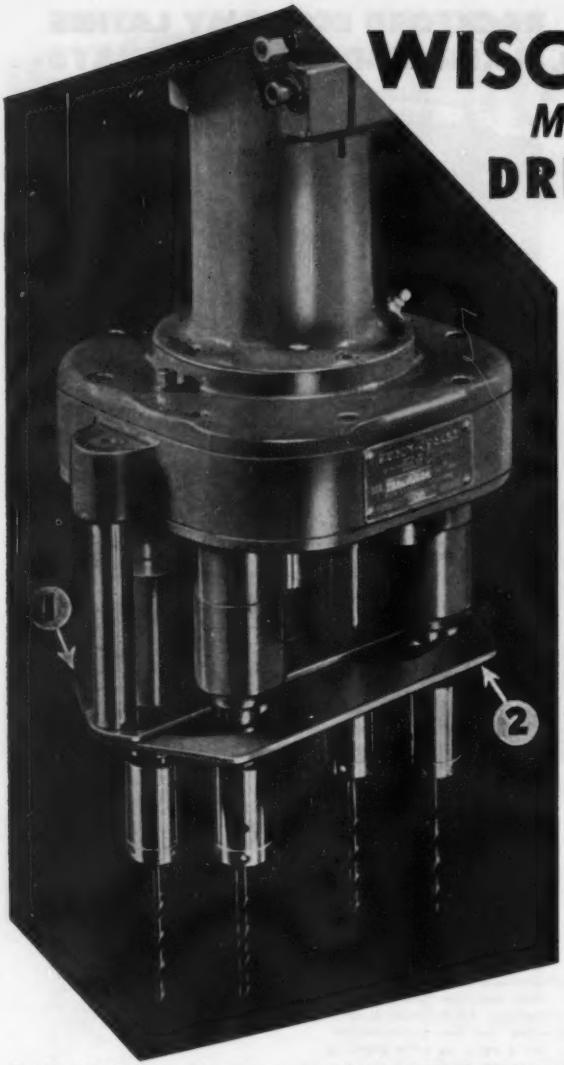

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Multiple
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Adjustable and Fixed-Spindle Types

Adjustable Spindle Heads have Dual Positioning Plates for fast, accurate set-ups that "stay put".

Positioning and Locking Templates are furnished for each bolt circle or hole pattern . . . to your exact specifications.

Half-hole Positioning Plates (1) make it easy to swing spindles into place quickly. Locking Plates (2), with full holes, are mounted on support posts to lock set-ups securely against shifting.

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These are a few of the features:

- **Rapid Ram Approach** — Automatically changes to power stroke when it contacts the work.
- **Movable Workhead** — Self-contained—easy to center over the work. Workhead can be purchased separately.
- **Variable Ram Speed** — From zero to maximum under fingertip control.
- **Modern Design** — All operating controls at convenient working height.

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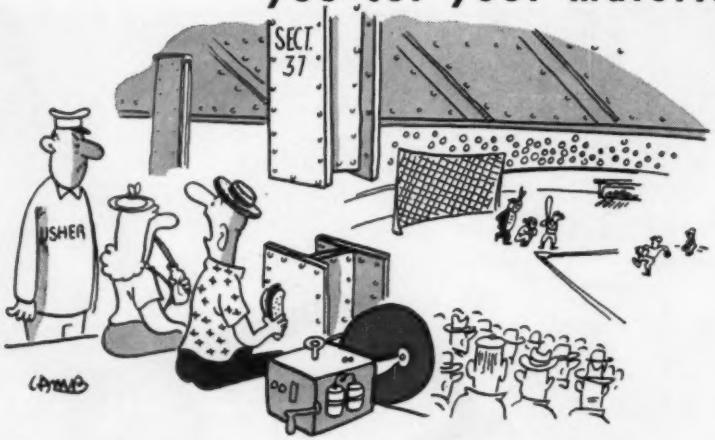
These and dozens of other features are fully described and illustrated in new Bulletin No. 347, which we will send promptly on request.

Dake Engine Company, 608 Seventh St., Grand Haven, Mich.

cut your costs . . . where you cut your materials



"I paid good money to see this game, and I intend to see it!"

Is your view of cost-economy obstructed by old-fashioned material cutting methods? If so, let us show you how dramatically some people have changed the picture by the use of abrasive cutting with specialized Allison Wheels.

Allison abrasive cutting wheels contribute to faster, better, cheaper production by greatly speeding the cutting operation and reducing time and labor costs.

For almost all materials, there is an Allison Wheel to fit the job. So don't delay. For a clear-cut view of bigger, better production, get the complete story from Allison, specialists in abrasive cutting for over 30 years.

WHEELS FOR PORTABLE GRINDERS

Allison supplies the finest grinding wheels for portable grinder work.

MASONRY ABRASIVE CUTTING WHEELS

Ask for further information about Allison's complete line of wet or dry masonry cutting wheels.

the *best* way to cut many materials . . .

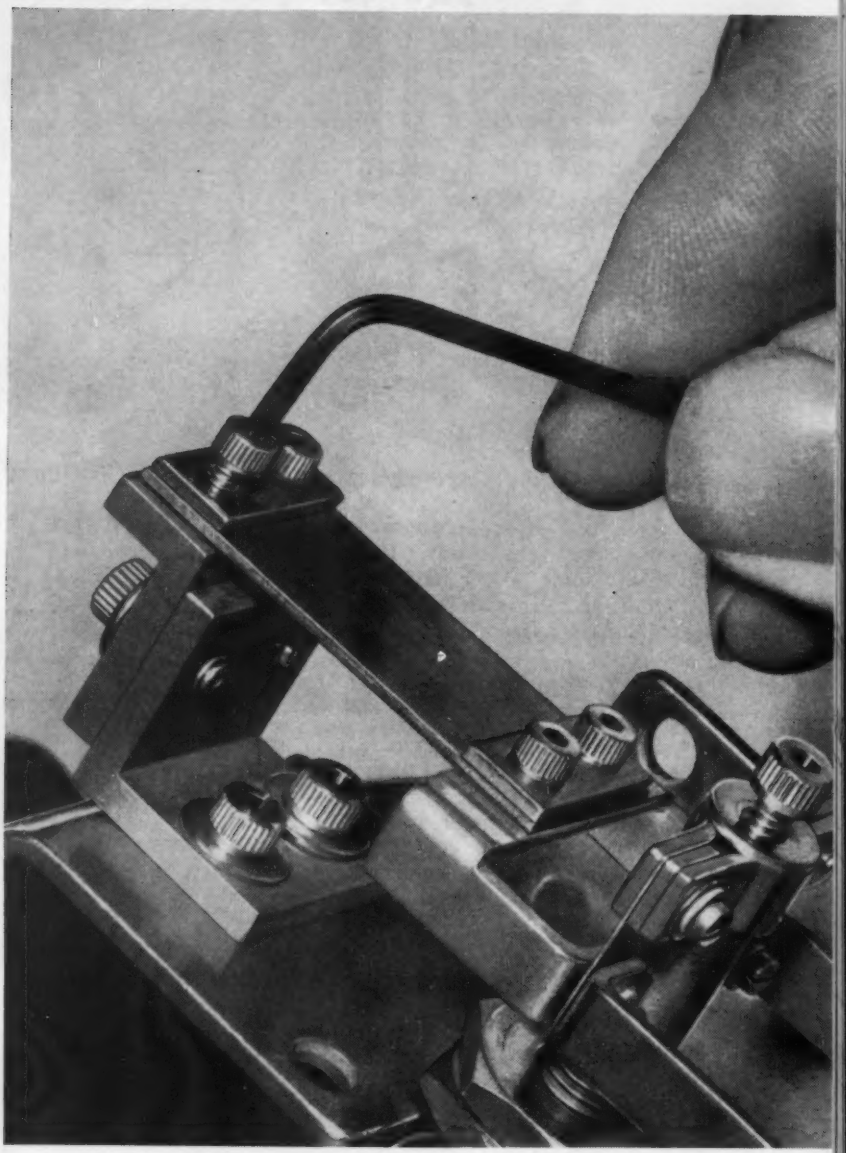
the *only* way to cut some.

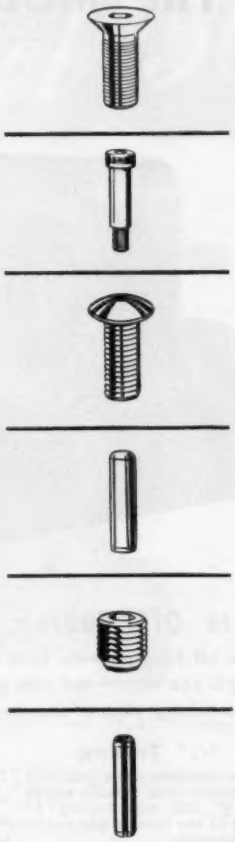
Allison ABRASIVE CUTTING WHEELS

THE ALLISON CO., 264 ISLAND BROOK AVENUE, BRIDGEPORT 8, CONN.

IAL55

UNBRAKO AT WOR

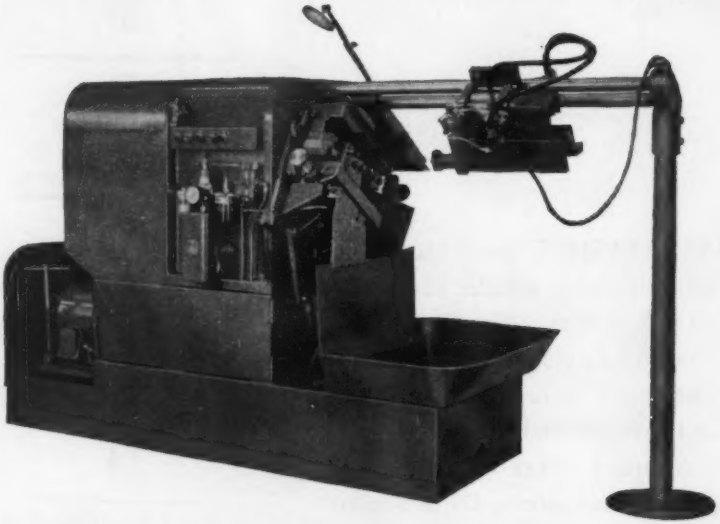




MINIATURIZATION. Small socket cap screws make possible smaller instruments. UNBRAKO Micro Socket Cap Screws range in size from #0 to #3, from ⅛" to ½" in length. But they have much more than microsize to recommend them. They are so strong that three UNBRAKOS will do the job of five ordinary cap screws. Or, if you must use the same number of screws, you can safely use smaller UNBRAKOS. All UNBRAKOS have knurled heads for easier handling and faster assembly, and uniform sockets for maximum wrench engagement. Your industrial distributor stocks UNBRAKOS. STANDARD PRESSED STEEL CO., Jenkintown 52, Pa.

UNBRAKO® SOCKET SCREW DIVISION SPS JENKINTOWN PENNSYLVANIA

The MODERN AUTOMATIC
CUTTING-OFF MACHINE



Cuts Off Tubing, Pipe and Shafting . . . FAST

Cuts off longer pieces than a regular automatic machine. In fact, cuts off *any length you want*—and cuts it *faster*. If your production requires quantity cutting-off of tubing, pipe or shafting, check the figures below against your present time.

½" Tubing
This machine cuts off and chamfers both outside edges of ½" .030 wall tubing, 5" long at the rate of one every 2.5 seconds.

1¼" Cold Rolled
This machine cuts off and chamfers both ends of 1¼" cold rolled, 20" long, at the rate of one every 20 seconds.

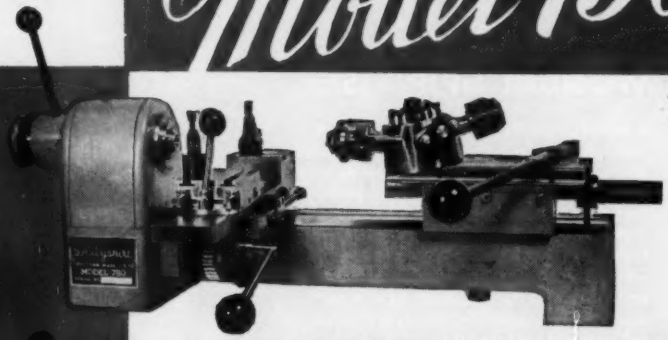
1" Tubing
This machine cuts off and chamfers both outside edges of 3" long, at the rate of one every 3 seconds.

These popular, time saving machines are now available in four sizes, handling work up to 6¾" O.D. Their many cost cutting features are described and illustrated in our latest catalog that will be mailed promptly on request.

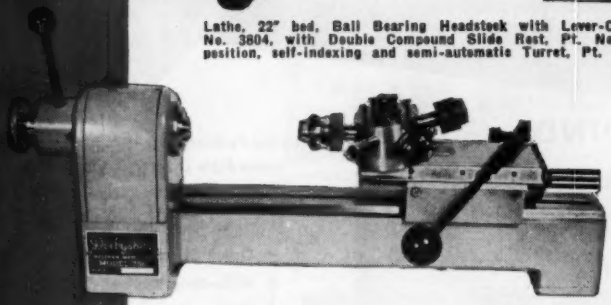
WRITE FOR ILLUSTRATED CATALOG

MODERN MACHINE TOOL COMPANY
Jackson, Michigan

DERBYSHIRE PRECISION LATHE *Model 750*



Lathe, 22" bed, Ball Bearing Headstock with Lever-Collet Closer, Pt. No. 3804, with Double Compound Slide Rest, Pt. No. 3652 and Six-position, self-indexing and semi-automatic Turret, Pt. No. 3610.



MANUFACTURED BY F. W. DERBYSHIRE, INC. Also manufacturers of "D.W.W.", "MAGNUS", and "ELECT" Lathes, Milling Machines and Collets.

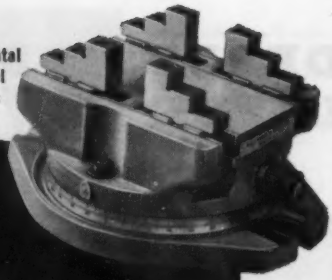
SPECIFICATIONS

Overall Length With Lever Chuck Closer 25"	Distance between Centers .....12"
Length of Bed .....22"	Center Height .....2.953" (7.50 cm)
Height to Top of Headstock 8½"	Maximum Collet Capacity .....315" (5/16")-(No. 80 metric)
Height to Top of Lathe Bed 4"	Maximum Spindle Speed .....18,000 RPM
Width of Bed .....2⅞"	Concentric Running of Ball Bearing Headstock Spindle .....0002"
Width of Ways .....1-13/16"	
Swing over Bed .....5.905"(15 cm)	Spindle Speeds with Variable Speed Drive:
Swing over Compound Slide Rest .....2⅝"	With Pulley Ratio 1 to 1..... 600 to 5,000 RPM With Pulley Ratio 2 to 1.....1200 to 10,000 RPM

For full details

F. W. DERBYSHIRE INC.

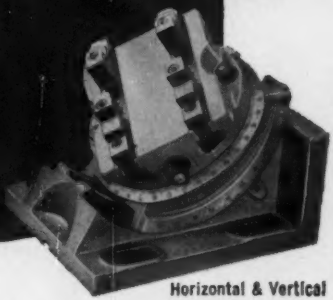
157 HIGH ST. • WALTHAM, MASS.



Horizontal Swivel Type

MULTI-PURPOSE WONDER GRIP VISES

4 STEPPED JAWS PERMIT CLAMPING of rough castings, irregularly shaped, round, and tapered pieces accurately and quickly, eliminating need for special jigs or fixtures. Narrow stepped jaws allow free access to and measuring of work pieces and provide clearance for cutting tools. Small work pieces machined on three sides without reclamping. Easy and quick to mount and align on any machine. Holds rigid in any position without vibration. Various capacities and extra soft jaws available.



Horizontal & Vertical Swivel Type

TAPPING ATTACHMENTS

Reversible safety tapping attachments with adjustable graduated friction drive, hardened, ground and lapped, complete with torque bar and handles. Precision made throughout by long established reputable West German factory.

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Tested for Performance to High Amer. Standards
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Low Competitive Prices

- **Quick Change Chucks and Collets**
- **Wille-Grip Keyless Drill Chucks**
- **Milling Machine Arbors, Adapters, Arbor Spacers and Bearings**
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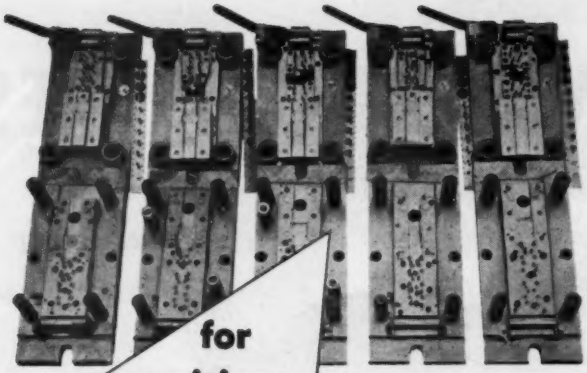
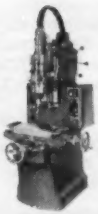


for precision jobs like this....Moore Jig Borers and Jig Grinders are "MADE TO ORDER"

NO. 2 MOORE JIG BORER. Range 10" x 16" x 16" height. Features infinitely variable spindle speeds, three power feed ratios, centralized controls.



NO. 2 MOORE JIG GRINDER. Range 10" x 16" x 16" height. Grinding speeds from 12,000 to 60,000 rpm. Infinite feeds up or down; spindle-housing heat control; features slot grinding attachment.

Moore Jig Borers and Jig Grinders are made to order for jobs that require precision hole location—and plenty of it.

Take, for example, these five progressive compound dies used to pierce, shave, gut and blank intricate timing-device parts.

Holes in punch plate and stripper were jig bored in a No. 2 Moore Jig Borer. Holes in the corresponding die parts were jig bored in the same precision machine, hardened and then jig ground in a No. 2 Moore Jig Grinder. Perfect line-up was insured, since all holes had to be held to ± .0002", both for position and hole size.

The No. 2 Moore Jig Borer, with its built-in system of accurate lead screws, can spot, drill, bore or ream all holes in a workpiece to "tenths" with minimum tool changes. The No. 2 Moore Jig Grinder can accurately contour grind, slot grind and form grind die sections in a third of the time required by other means.

These Moore toolroom teammates provide a one-two punch that can knock the fat off your diemaking costs. They supply an *Engineered Hole Location Service* that permits tool and die sections to be produced concurrently...puts diemaking on an interchangeable-parts-and-assembly basis...lengthens die life...*saves you time and money* all along the line.

Write today for our detailed literature that pictures and describes many toolroom and production jobs for which Moore Jig Borers and Jig Grinders are made to order.

MOORE SPECIAL TOOL COMPANY, INC.
728 Union Ave., Bridgeport 7, Conn.

ADD MOORE TOOLS TO YOUR TOOLROOM

JIG BORERS • JIG GRINDERS • PANTO-CRUSH WHEEL DRESSERS • DIE FLIPPERS • MOTORIZED CENTERS • HOLE LOCATION ACCESSORIES

NEW L&J NO. 7 PRESS

RIGID – ACCURATE – EFFICIENT – with a LARGER WORK AREA

This new press will give you greater production at lower cost. Its alloy iron frame has exceptional rigidity which holds deflection to a minimum and gives closer tolerances, greater uniformity and longer die life. Accuracy is also obtained through adjustable gibs of extra length. The rugged ram adjusting screw has buttress threads and replaceable hard bronze seat. Air clutch optional. Geared and non-geared models.

Specifications: capacity 75 tons, standard stroke 4", strokes per minute 42 (non-geared 85), die space 14" to 22".

Write for Catalog

21 O.B.I. models — 8 to 90 tons

L&J PRESS CORPORATION

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American FOR LEADERSHIP

IN SERVICE, RELIABILITY and QUALITY

SEE...

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To be sure you get all of these American standard features use American drill jig bushings.

Double ground lead for easy pressing into the jig. Radius into the hole — to prevent tool hang-up, wear and breakage.

Two way undercut under the head to insure squareness to the jig.

100% concentricity inspection.

Internal ground holes to insure straightness.

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TOOL WORKS
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Collapsible Tap

Stationary and Rotary, and in five sizes ranging from 1 5/16" to 3½", these New MC Taps have more new features—money saving features—than we can tell you about in this ad.

The complete story is in Bulletin M-113. It's yours for the asking. Mail this coupon today!

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MODERN TOOL WORKS DIVISION
565 Blossom Road, Rochester 10, N. Y.

Please send me without obligation your new Bulletin M-113 giving full information on modern MC Collapsible Taps.

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MODERN TOOL WORKS

DIVISION

CONSOLIDATED MACHINE TOOL CORPORATION

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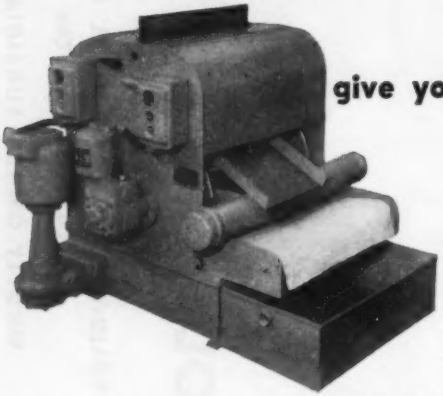
WHOLLY OWNED SUBSIDIARY OF
FARREL-BIRMINGHAM COMPANY, INCORPORATED

BARNESDRIL

COOLANT FILTERS

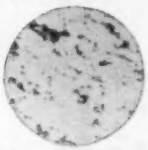


give you **2 Stage*** **COOLANT CLEANING**

For Selective Degree of Coolant Clarity

BarnesdriL Engineers provide two distinct stages in coolant cleaning. The new Kleenall Unit *combines practical magnetic separation for removal of ferrous particles, *with positive cleaning by filtration to eliminate non-ferrous or other objectionable foreign matter. With control inherent in this method it is possible to give you the exact degree of coolant cleanliness that is practicable for your production operations.

Complete Lab Facilities for Your Convenience



Typical microphoto of composite swarf from a high production cutting operation.

In their modern coolant laboratory, these engineers can precisely measure waste particles and classify them by physical types. Percentage of contamination is thus determined, and they are then able to select a filter medium and unit to give you the degree of coolant clarity desired.

Ask a BarnesdriL representative today for an analysis of your coolant cleaning problems and recommendations for the most practical solution.

Write for Catalog 350G

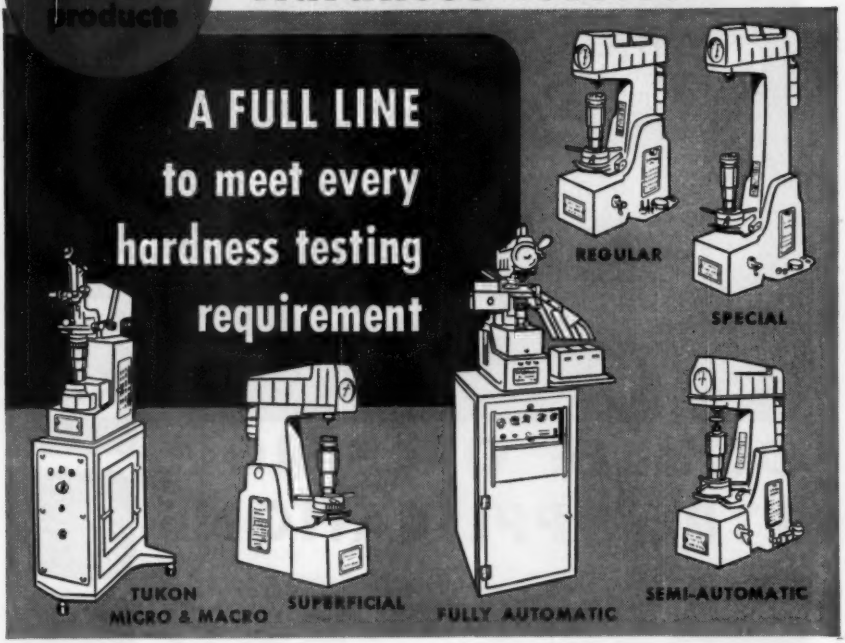
COOLANT BARNESDRIL CLEANING

FILTRATION DIVISION
BARNES DRILL CO.

860 CHESTNUT STREET • ROCKFORD, ILLINOIS

ACCO products

Wilson "Rockwell"* Hardness Testers



• Hardness testing standards of the metal industry have been set and maintained by WILSON "ROCKWELL" Hardness Testers since 1921. In steel mills, non-ferrous mills and metal fabricating plants everywhere, WILSON "ROCKWELL" standards have been the mark of perfection for a generation. What is your testing problem? Whether your material is hardened steel, sheet metal, small parts, tools, rounds, tubes, soft metals or plastic materials—all are tested quickly and accurately by one of the many WILSON models.

Let a WILSON expert discuss your hardness testing problem. There is no obligation.

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Wilson Mechanical Instrument Division
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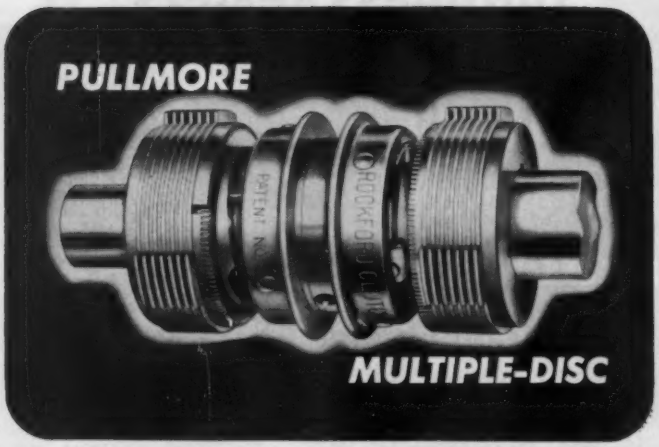

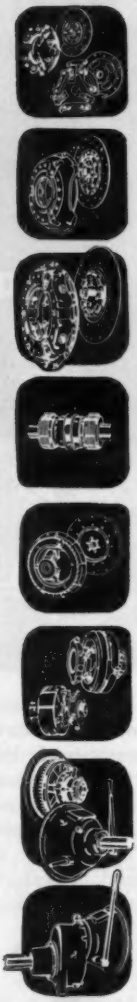

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- LONG WEAR LIFE
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* These compact, powerful, multiple-disc clutches are helping product engineers to reduce size and weight of the vital link between the driving and driven units of machine tools, lift trucks, overhead cranes and a wide variety of other production equipment. They readily fit into product designs, accommodating great torque capacity within small size. Precision grinding insures perfect fit on the clutch shaft. Symmetrical contours avoid drag that is caused by centrifugal force.

Send for This Handy Bulletin

Shows typical installations of ROCKFORD CLUTCHES and POWER TAKE-OFFS. Contains diagrams of unique applications.

Furnishes capacity tables, dimensions and complete specifications.

ROCKFORD CLUTCH DIVISION BORG-WARNER

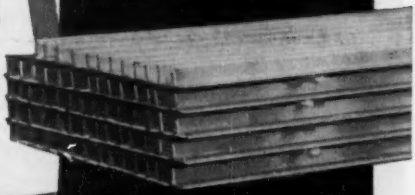
▲ 1309 18th. Avenue, Rockford, Illinois, U.S.A. ▲

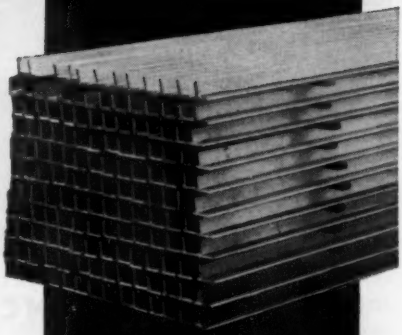
CLUTCHES

"Helicarb" Cutters jump production 2¼ times!

...at Convair Division, General Dynamics Corporation, San Diego

Conventional method:
68 spars in 37½ hrs.





With Helicarb Cutters:
154 spars in 37½ hrs.

Improve finish; eliminate handwork!

"Helicarb's" cutting angle is constant over the full length of the flute, producing a unique, shearing cutting action. Chatter and impact is sharply reduced, resulting in less crumbling of the carbide and finishes of 20 r.m.s. and better. Proper chip flow design reduces recutting, giving 2 to 3 times more production between resharpening.

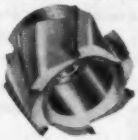
Your "Helicarb" distributor has complete data.

HELICARB

Now standard in these models!

End Mills

Interlocking Side or Straddle Mills



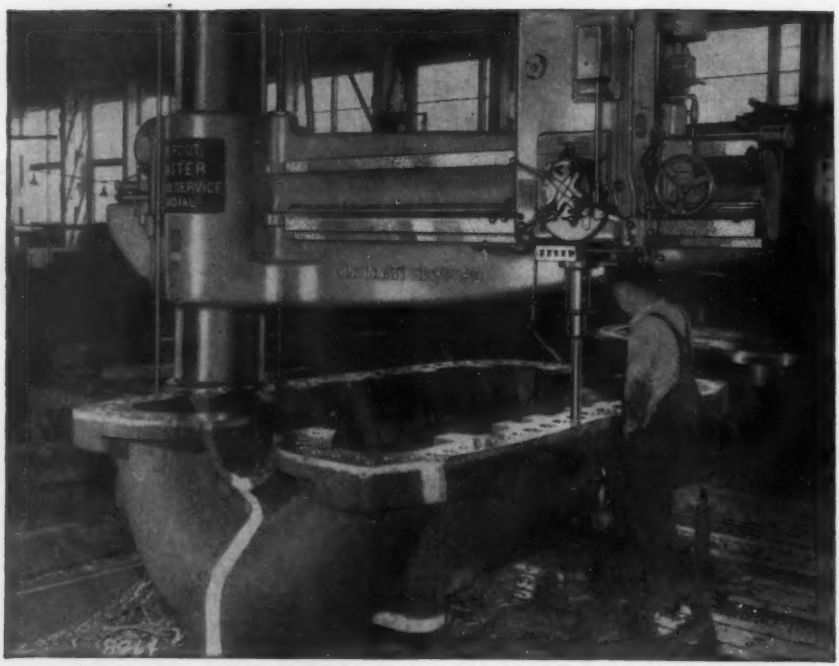
Shell Mills

Slab Mills

Stagger-toothed Side Mills

Sonnet Tool and Mfg. Co.

576 North Prairie Avenue
Hawthorne, California



STARTLING CINCINNATI BICKFORD

TIME SAVINGS

AT WESTINGHOUSE

10′ Cincinnati Bickford Master Super Service Radial at Westinghouse Electric Corporation, Sunnyvale, California.

Photos courtesy The Westinghouse Electric Corporation.

This Cincinnati Bickford Master Radial Drill with 26″ diameter column, the largest built in America, is drilling this tough nickel alloy-steel steam turbine housing with a startling time saving. The time for drilling one 4 1/16″ diameter hole 21″ deep before installation was 2½ hours. Now, the 40 HP of this machine hogs out the metal in one hour. Write for details.

80 YEARS OF SERVICE

CINCINNATI BICKFORD

RADIAL AND UPRIGHT DRILLING MACHINES

THE CINCINNATI BICKFORD TOOL CO.

Cincinnati 9, Ohio, U.S.A.

AS THE *Editor* SEES IT

Automation and its Problems

As with everything new Automation is accompanied by its own peculiar problems to which answers must be found. Some of the more lively, while not present in every instance, may introduce themselves soon; in fact, some of the unions are already dipping their quills into the ink and exercising their vocal chords, readying themselves to resolve the monster Automation.

Many highly intelligent labor leaders realize that progress cannot be stemmed, that answers must be found which will be acceptable to the situation created by special machinery. One labor leader, however, suffers greatly from Automation Hallucination. He says that is fine while times are good, but when times are bad . . . ha, that's different. Nix! The disruption during bad times caused to the labor force would be unwise, hence replacement of equipment should not be undertaken. The central idea is simple: replace during good times, keep the old during bad times.

One question immediately comes to mind: does this philosophy apply only to Automation or does it apply to automobiles? Should people stop buying automobiles during bad times? Should they hide their money in the sock and buy nothing? No refrigerators? washers? Good grief, should they not even replace their worn-out socks?

The only reason this philosophy is at all discussed is because it was postulated by a prominent, important and usually intelligent labor leader whose thinking, if it be wrong, can cause irreperable damage to manufacturing. He approaches the problems of automation with a meat axe, like the chappie who will cut off his nose if his cold gets any worse!

And yet, like all new developments, right-thinking labor leaders working with management will iron out whatever differences are caused by Automation. Such matters as: incentives systems, relocation of workers, retraining of personnel, group bonus plans, etc. will all be affected by the use of large numbers of special machines and special tooling. Unquestionably, relocation of workers will be an important phase of labor-management discussions. Retraining, severance pay, increased unemployment insurance, work guarantees, possibly a form of guaranteed annual wage may be a starting point for labor-management discussion. No one can say at this time just what form the discussions will take or what answers will be found, nor how correct the proposed answers will be.

Much blood has flown in the gutters in the crusade against progress. It was so uselessly shed; it accomplished so little. Progress cannot be arrested, and Automation, a form of progress, cannot be halted.

William F. Schleicher

SPECIAL INTRODUCTORY UNIT

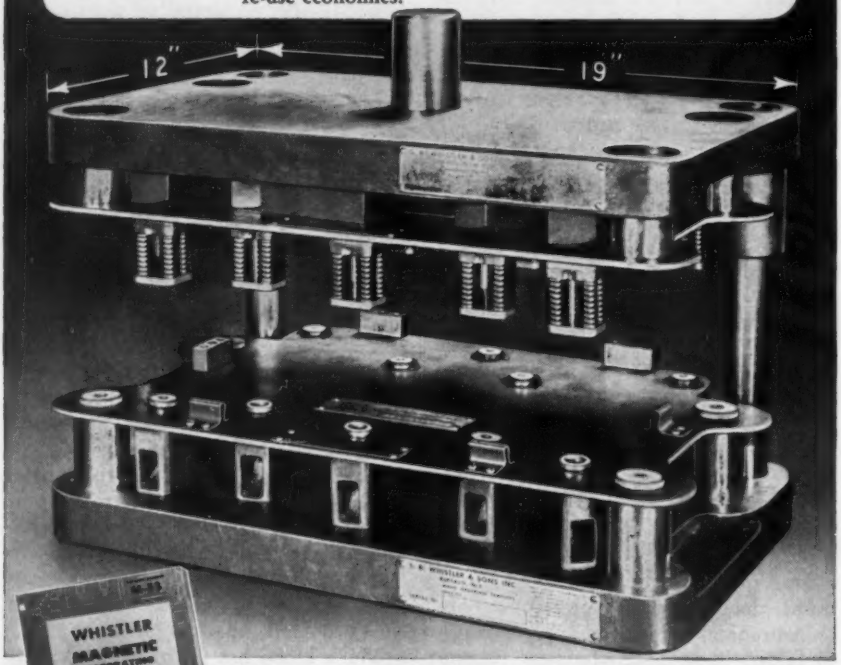
WHISTLER 10 HOLE MAGNETIC PERFORATING DIE

Cut die costs drastically, start production quicker

This M-12-14 Complete Introductory Unit includes a set of blank templates, ten punches, dies, strippers and punch and die retainers complete to make up a 10 hole precision perforating die. Any diameters from ⅛" to ½" to your selection. Catalog illustrates additional re-use economies.

$675

NET F.O.B. OUR PLANT



SEND FOR CATALOG Illustration shows how quick and simple it is to set up a Whistler Magnetic Perforating Die ready for production. Larger standard units can be added to suit your requirements.

S. B. WHISTLER & SONS, INC.

Manufacturers of Adjustable, Magnetic and Custom Built Dies for All Industry

WHISTLER DIES ARE CUTTING COSTS FROM COAST TO COAST

746 Military Road **Buffalo 23, New York**

very truly!

Letters to the Editor

Shop Hints

Your December Shop Hint has the best system I ever saw in print for making accurate tapered arbors. This appears on page 219.

It reminds me of gauges I had to make to check accurate tapers on 5, 7 and 9 blade spiral taper reamers. This is one I never saw in print.

"Hi" Johnson, Owner
Universal Propellor Service

Description and sketch of "Hi" Johnson's idea appears in this month's Shop Hints.

Must Be Under 40

One of our Senior (employed) members has mailed us your editorial entitled, "Must Be Under 40." (BB, Oct., p. 140) It is now on the Bulletin Board.

This is an extremely helpful gesture on your part and it is very much appreciated by the men in this group.

Boston is the home and birthplace of the Forty Plus movement and this is the original group organized in June, 1938, by Roland Darling.

We were instrumental in having AGE written into the discrimination law in Massachusetts. However, they get around that . . . so we aren't too sure that it does too much good.

Thanks a lot! Such publicity must hit home somewhere.

E. V. Morrow, Chm. Exc. Comm.
Forty Plus of New England

Slogan of the Club is "There is No Substitute for Experience" with which we heartily agree. Nothing is more stupid than to deny a man work because of his age. The world has moved forward under the experience and genius of people over forty. While some companies are beginning to raise the age limit the movement is not general. Remember, a young man of 40 today is younger than grandfather was at 30.

Am honestly happy to see some intelligent man of your stature speak out about "Must be Under 40."

Recently placed an application with the company who is operating one of the newer atomic energy plants. While I am just 40, received a negative reply.

Back in 1932 when I got out of engineering school it was necessary to pay to work in an engineering office. Then, about the time I had some experience, spent four years in the Army. Now that I have sufficient experience and more knowledge, I'm over 40 and no one wants to pay for the experience they believe a worker should have.

It is a sad commentary on America when employers refuse to consider men on their record and instead tie them down to age limitations.

Going back to the atomic program: if we aren't going to hire men on their ability and energy what will we accomplish? I doubt very much if Russia isn't using "old men" to accomplish her ends.

Over Forty
Chicago, Ill.

Information, Please

In your MACHINE and TOOL BLUE BOOK (I think it was May, 1954) you

ran an article on a dial indicator with only four moving parts. The book I had became lost and I haven't found a mention of this in other magazines. Will you please send me the name of the manufacturer.

Henry Regenthal
Newark, New Jersey

Recently I've heard of a new process for penetrating nearly any material by high frequency vibration.

Since we find ourselves becoming more involved in the machining of intricate shapes through materials, I would appreciate any efforts you can make to supply me with such information or literature you may have regarding this process, or direct me to the proper source of such information.

Edward C. Andrews, Tool Eng. Dept.
Gerotor May Corp.

Information sent.

Received Time Study Articles

We wish to thank you for forwarding to us the first three parts of Mr. Nissley's articles on Time Study. We believe them to be as well executed as anything that we have previously had in relation to Time Study and Job Analysis.

Our people would like to congratulate the author, the editorial board and the editorial staff of the BLUE BOOK for printing this fine series.

Fred G. Wilson, V.P. Manufacturing
Waterbury Companies, Inc.

The articles are well written and informative in a general way. I find nothing to criticize except the rather antediluvian attitude he (the author) takes regarding industries having to pay the operators for the "personal" time they need. He makes himself look a bit silly in this part. One might ask him if he deducts his "personal" time from his bill to management.

J. J. Mitchell
Chicago, Ill.

I have read Time Study, parts 1, 2 and 3 and found them interesting, easy and quick to read. It was a common sense and practical presentation. Of course, it didn't cover all of the problems but enough of the important ones to create some thinking. References were made to other sources for more detailed study.

Presentations like this in the different areas of time study and industrial engineering are very helpful. Thank you for the articles. Any similar articles are welcome as reading material for foremen, time study men, trainees, etc.

A. E. Aronson

We find Mr. Harold R. Nissley's articles on Time Study very interesting and we would appreciate your sending us reprints of them.

We believe we could use some of his principles in our machine shop . . . primarily a job shop for the production of small lots (1 to 10 pieces) of roller and silent chain sprockets.

G. E. Fenton, Master Mechanic
Morse Chain Co., (Ithaca, N.Y.)

Wants Reprints of Time Study

I would like to have tear sheets or reprints of Mr. Harold Nissley's articles on Time Study, which have appeared in your publication this year.

You are indeed performing a valuable service in making this type of material available to your readers.

Gene Babcock, Standards Supervisor
The Challenge Machinery Co.

I read in your December issue (Letters to Editor) that you are planning to reprint Mr. Harold R. Nissley's articles on Time Study in booklet form.

I would very much appreciate the opportunity of receiving this booklet if it is printed.

In the meantime, please send me the reprints which are available.

T. N. Sitzler
Florence Pipe Fndry. & Mach. Co.

. . . please send reprints of first three articles on Time Study.

J. D. Schneider, Prd. Eng.
Oldsmobile

. . . Tear sheets or reprints on Time Study.

F. A. Penninger, Methods Sup.
The Oliver Corp. (South Bend)

. . . reprints of Time Study.

A. B. Lundahl, Gen'l. Sup.
John Deere Des Moines Works

. . . tear sheets of Time Study.

A. L. Roberts, Ind. Eng. Sec.,
Mfg. Eng. Dept.
Ford Motor Co. (Monroe Plant)

The first five articles have been reprinted. They've gone like hot cakes, but a few are still left. First come, first served.

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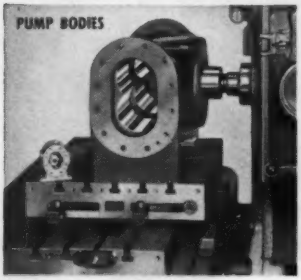

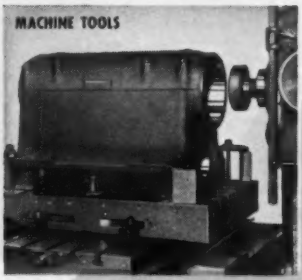

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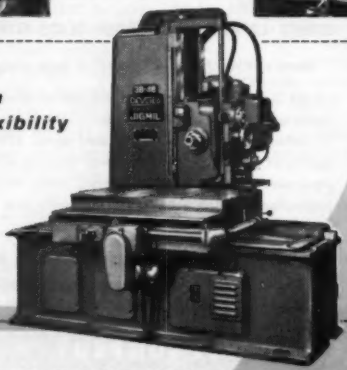

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Leaders of Thought in Industry

An interview with Carl J. Snyder, vice president, Chrysler Corp.

Q. What are the long range plans of Chrysler in regard to replacement of present equipment? And, will present obsolete equipment be replaced by any type of automation or standard equipment?

A. We've always had a steady job of replacing equipment. During the past five years we've had to buy new equipment for three new engines, two new transmissions and two new steering gears, and have completely retooled our axle plant. We are now completing plans for a new body paint setup including a new building at our Chrysler Division. During the past five years we have spent about $600 million in new equipment.

We are interested only in the latest type of tooling and will apply it where we can see it will amortize itself in a reasonable time or where production accuracy and safety can be improved. At our former Briggs Press Plant we are doing some automation with our press line in labor saving devices.

Q. Does your present program cover defense needs in the event of a major rearmament program?

A. We have a special defense department which works closely with the government. At present Chrysler has 1,100,000 square feet of space at our plant at San Leandro, California, which we can use, and are hopeful of using for the government defense program. I think we at Chrysler, and the automobile industry in general, are prepared to meet any emergency defense program.

Q. What is the present outlook of Chrysler in regard to business economically and employmentwise?

A. Our outlook for '55 is good. We feel that 1955 will be better than this year, and we plan to have 160,000 employees producing for us, which should be an all-time high.

Q. Do you think the automobile industry will continue its present rate of expansion over the next five years?

A. The automobile industry will keep on expanding as long as the population of this country increases. Twenty years ago people were saying the saturation point had been reached. In 1954 it now appears that it has not. Many people now find they have need for two or more cars. Five years ago one manufacturer predicted the industry would be tooling for 10 million cars annually. However, we think the industry will eventually be tooling for about 8 million cars annually. We are now tooling for 1.2 million cars, which we feel is about 20 per cent of the market for 1955. This percentage represents our 'historical' share of the market.

Q. Does Chrysler have any intention of increasing or decreasing production in 1955 as compared to 1954 figures?

A. We are planning an increase over our 1954 figures.

Q. Do you feel that the present tax depreciation law discourages the replacement of old equipment, and, if so, do you have any suggestions for a remedy to overcome this situation?

A. First of all in regard to tax depreciation on machinery. The present 1954 tax depreciation law was designed to liberalize depreciation and to encourage industry to modernize. Countrywise, it discourages retention of old and obsolete equipment.

Q. How much money, percentage or dollar wise, does Chrysler pay out annually for the purchases of tools with outside concerns?

A. We believe 1953 can be taken as an average year. In 1953 Chrysler purchased $45 million worth of dies, jigs and fixtures from 1,100 different vendors. And in the same year Chrysler also purchased $3 million worth of perishable tools from 600 vendors.

Q. How can tool and die manufacturers best approach Chrysler for the purpose of obtaining orders?

A. We do not make our own tools, jigs or fixtures. They are purchased outside. We found it unsound to hire a lot of people to make tools for only a short time during the tooling of a new model and then lay them off. We purchase about 75 per cent of our dies from outside concerns and it is our general policy to have tool suppliers deal with the master mechanic of each

Carl J. Snyder was born in York, Pa., Nov. 29, 1896 and served a toolmaker's apprenticeship with the Detroit Lubricator Company in 1918.

He joined the Maxwell Company in 1921, and for the following seven years served in various tool engineering capacities throughout the company. From 1928 to 1940, he was master mechanic of the Dodge Forge and Dodge Truck Divisions. He was then named supervisor of the company's central estimating department, a position he held until 1942 when he was assigned as master mechanic of the company's atom bomb project.

With the completion of this work in 1944, Mr. Snyder was made general master mechanic of the Dodge-Chicago plant, where giant B-29 engines were produced for the armed forces.

In 1946, he was returned to Chrysler's Highland Park General offices as staff master mechanic for the corporation, and in 1948 was named general manager of the company's Lunch Road Plant in Detroit.

He was named operating manager of the company April 9, 1951, and elected a vice president Sept. 23, 1952.

of our plants. All new equipment must be tested in our plants before we actually purchase it. Cutting tools, for instance, must be tested by the Standards Committee. The results are then discussed by the committee and our master mechanics.

Q. What part do plastics play in the manufacture of your automobiles?

A. We have developed some plastic dies which show great promise. Our experts have made dies out of liquid plastic that will withstand more than 20,000 pounds pressure per square inch in stamping of steel parts. The primary advantage of plastic dies is in the speed in which they can be produced and the resulting economy.

While conventional steel dies require three to eight months to manufacture, the new plastic dies can be made in three or four weeks. Even the experimental dies are now being made as much as 30 per cent cheaper than conventional dies, and when they are used on a large scale the saving in the cost of the dies may be as high as 70 per cent. The advantage of using plastic dies is that frequent changes in car styling will now be possible on low production models. Another possible result of this new process is that tooling cost of sports cars and luxury models may be reduced. It may mean, too, that the customers of the future will have a greater variety of car styles to choose from in each line of cars.

Q. Has Chrysler any plans in regard to using aluminum an an engine material?

A. We have worked with aluminum for automobiles for some time and I think that we have more aluminum parts in our automobile than any other manufacturer. I feel that an aluminum motor block is bound to come into the industry. However, I do not know when that will be, or if it will be in my time. Aluminum is a high cost material. It has definite advantages in being lightweight. This is what the automobile industry wants—a lightweight engine. A 1954 Chrysler sedan equipped with standard aluminum parts weighs approximately 183 pounds less than it would if the same parts were made of heavier metal. And in the case of our convertibles, which make

A workman puts the finishing touches on a completed plastic die by going over it with sandpaper. Even though this is a large die, it looks deceptively fragile. If struck hard with a hammer a dent will appear, but this will disappear without the trace of a scratch in a few minutes. Dies such as these can be made in a fraction of the time and at a fraction of the cost of conventional steel dies. Should the die be chipped it can be repaired easily and quickly with a secret Chrysler "quickpatch." The steel weldment on which the die is mounted is simply used to fit the die into the press.

an even wider use of aluminum and magnesium castings, the weight saved is about 225 pounds. This means that Chrysler owners do not have to pay for wear and tear of carrying around a heavy, unseen passenger whenever they drive.

Shown above are the more than 64 pounds of aluminum and magnesium castings used in a Chrysler sedan. Patricia Burr, of Chrysler Corporation's Styling Studios, easily holds the big aluminum torque converter housing which, if it were of cast iron, would be too heavy for her to pick up.

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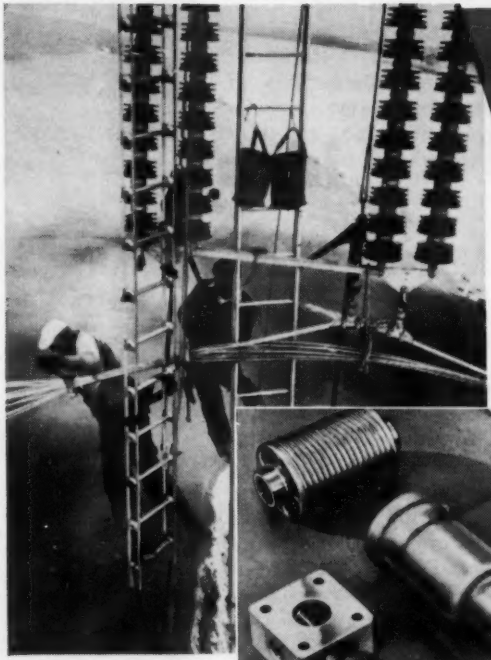

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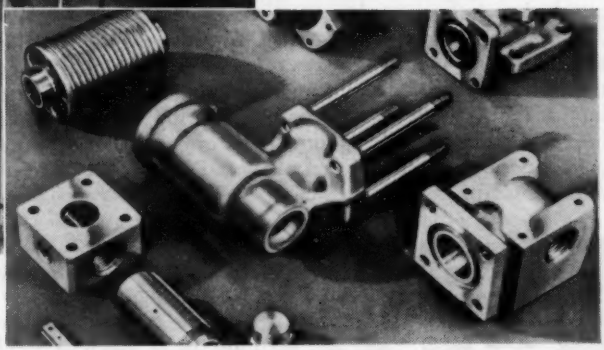

Industry depends upon the special skill of overhead linemen to keep the "hot" wires carrying power to turn the wheels. Many product manufacturers depend upon the special skills of Vinco production personnel to supply component parts. Because these parts are supplied at competitive costs and with a very minimum of scrap, they create an added profit for the customer.

All tools and gages used for mass producing component parts from ferrous or non-ferrous metals are designed and made to Vinco high standards in its tool and gage plant.

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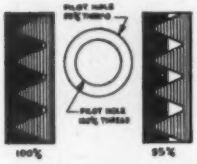
Slugs Cut by Hole Saws neatly disposed of. Steel spring, attached to hole saw pilot, serves as ejector. Saves operator 2 to 3 min. per hole. Wrap a 3½" length of steel wire twice around the ½-inch hole saw pilot. Pull these two loops tight to secure wire on pilot, then bend the rest of the wire into a four-coil cone-shaped spring. Spring compresses as hole saw makes cut. After completion of cut spring pressure pops slug out of saw. From: Frank P. Rose, Jr., Temco Aircraft Corp.

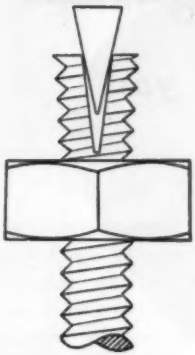


Advantages of 55% Thread. A full, or 100%, thread not only overloads the tap that cuts it, but also causes the screw to drag, making driving difficult. A 55% thread requires much less energy to produce, decreases mortality of taps and will hold almost as much as a full thread. Keller Tool Co., Grand Haven, Mich.

Mounting and Removal of Workpieces facilitated by standard bar knobs. On precision boring of transmission housings and power take-offs bar knobs facilitate rapid handling with great accuracy. No special tool required. Bar knobs eliminate special fixture designs, making of special clamps and other components. Low in cost because they are standard stock items. From: West Point Mfg., Detroit.

Spacer Blocks to support the skins of the leading edge of aircraft inboard flaps were formerly machined from 75S-T6 aluminum alloy bar stock at high cost. Now spacer blocks are investment cast of 35S-T6 aluminum alloy. Investment casting has slashed cost per part approx. 50% due to eliminating machining operations. From: National Precision Casting Corp., Clifton Heights, Penna.

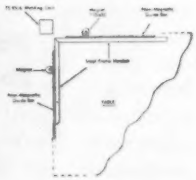
Small Nylon Bearings available to manufacturers of instruments, controls, clocks and other small mechanisms. Dimensional changes due to moisture absorption eliminated by compensation gap principle. Use of bearings said to eliminate periodic lubrication, give longer life, smooth operation, low cost. Bearings corrosion resistant, non-contaminating, operate in liquids. From: Thomson Industries, Inc., Manhasset, N. Y.



Prevent Nuts Sliding Off Bolts. Make a slot with a hack saw in protruding end of the bolt, reaching close to the nut. Put a small wedge in the slot to open it slightly. Nut cannot get loose. If you want to open the nut remove the wedge, serrate the slot, and turn nut. From: Federico Strasser, Santiago, Chile.

Mistic Mist Coolant Systems are compact, portable. May be installed from one machine to another in minutes. Ordinary air pressure used, 25 to 30 lbs. Claimed tool life increased from 50% to 200% with use of mist cooling. Mist generated at tip of nozzle, regulated by a simple needle valve. No tanks, piping, valves, gauges, filters needed. Free information: encircle E on Action card opposite page 64.

Permanent Magnets hold steel register frames at perfect 90° angle for rapid welding. Welding fixture consists of two non-magnetic guide bars, positioned at 90° from each other. Guide bars are so located when two frame ends are brought together the pre-cut 45° corner ends of the sections protrude beyond the bars to butt tightly together, forming a 90° angle directly underneath the electrode Horseshoe-shaped permanent magnets act as automatic holding devices; one magnet for each non-magnetic guide bar. Each



located six inches from end of each guide bar. Magnets have 25-lb pull. Due to welding heat magnets are re-magnetized every three weeks. Production greatly increased. From: Carboloy, Dept. of General Electric Co.

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Capital Roundup

by Arnold Kruckman
Blue Book Washington Correspondent

WASHINGTON . . . The pair of Senators from Tennessee are Jerre Cooper and Estes Kefauver. By one of those curious twists of fate Jerre Cooper becomes the Senior Senator and is the Chairman of the Ways and Means Committee, than which there is no more important Committee in the whole Congress. This Committee dictates how and by what means Congress shall function so far as the Senate is concerned; and since the Senate is an extremely important part of this section of the Congress it doesn't take very much perspicacity to realize how important and how troublesome this Committee can be.

It will be remembered that during the last Session Daniel A. Reed (R.-N.Y.) was the Chairman of this Committee. It so happened that Senator Reed was a Right Winger and fought for all the things that those strive for who believe that patriotism is fundamental. This should not be construed to mean that the other gentlemen are not patriotic. Kefauver's Leftish tendencies are well known and do not require much analysis. Cooper has always been a very uncertain gentleman, rather procrastinating and unsure in his leadership, even as a Senator. What he may do as Chairman of the tremendously important Ways and Means Committee, both as a Leftist and as a curiously uncertain person, is one of those things that everybody is guessing about here in Washington. Bear in mind, however, that Jerre Cooper is a gentleman and a scholar and his shortcomings will be those of a person who doesn't know what he wants to do from day to day. It would not be at all surprising if the Leftish-Liberal Party, which is another name for the Democrats, were to induce Cooper to give the job to one of the other stronger Members of the Ways and Means Committee. Unhappily, none of them are very well known. The outstanding man of the Committee is Cecil R. King. Mr. King is American born, but served with the Canadian troops in order to get into the First World War early. There would be few men, or women, who would debate the fact that he is a very good looking, distinguished citizen, and has every quality of statesmanship. His name is way down on the roster and there would have to be some very tall arranging to put him into the place of Chairman. However, the Left-

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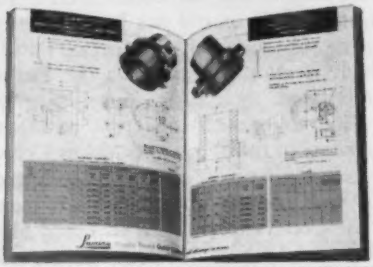

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Wingers, and even the Right-Wingers, have a very high regard for Cecil King. The night that FDR died he spent with your Correspondent at dinner and there were few people who were so deeply affected in a personal sense as were Cecil King and Mrs. King. Mrs. King had to go home. She simply couldn't stand public appearance on that night. They both felt it purely as individuals and not in the political relation. They were very fond of him.

Foreign Trade and Tariff

Congressman Reed who has been the Chairman of the House Ways and Means Committee, has made no secret of the fact that he will fight any Administration foreign trade program which hurts American workers and producers. It was Mr. Reed, and some other Republicans, who succeeded in blocking Eisenhower's plan in the 83rd Congress to extend the Reciprocal Trade Act for three years, the power to give the President the power to cut tariffis an additional 15%. Finally, Eisenhower, who of course didn't know too much about tariff, took advice from many other persons, and settled for a one-year extension without additional tariff-cutting power. But there isn't the remotest doubt that during the next Congress he will put on all pressure to enact a full program to extend the Reciprocal Trade Act, as well as other trade-cutting powers. The pity of it is that Eisenhower, himself, really doesn't understand the situation thoroughly, but is guided by others who are set to cut the tariff and to make other changes that will unquestionably hurt workers and producers.

It is common gossip and talk in Washington that the Democrats, who will be in control, will do their utmost to endorse the foreign trade program.

Mr. Reed gave out a prepared statement which should be repeated: "I have been in Congress longer than any other Republican and because I've always stood for Republican principles have been called a Conservative Republican. I have never hesitated to disagree with this Administration, or any other, if, in my judgment, they proposed unwise measures.

"In the next Congress if there is an attempt to push through a foreign trade program which does not protect the interest of our American workers and producers I'll demonstrate what I have said." Mr. Reed has been in Congress since 1918. He fought vigorously to prevent Eisenhower from securing a six months extension of the corporation excess profits tax early in the Administration.

Congressman Reed also proposes to fight with all his might any effort to repeal the "Buy America Act" next year. The "Buy America Act" requires Government agencies to favor American concerns rigidly over foreign competitors unless there is an unreasonable difference in price. The President recently issued an Executive order setting up uniform practices for purchases which set up the price-spread factor from about 7% to 10%. However, some domestic companies in designated areas will get limited preferred treatment.

Labor Clashes

Another clash of interests is between the Secretary of Labor James P. Mitchell, the White House, and the Labor organizations. This clash is bound to arouse considerable controversy in the next Congress. Mitchell was supposed to transmit recommendations dealing

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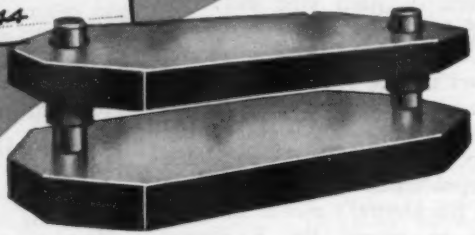

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with the minimum wage scale. He promised to make such recommendations when he appeared before the Labor organizations last Fall at their national gatherings.

There is a regular system by which such recommendations are transmitted. They go from the Secretary of Labor to the President, or to the President's representative at the White House, and from him they go to the Congress. In this case they are supposed to go to the next Congress, the 84th. The presumption has been that the recommendations would be to raise the 75c minimum wage scale to $1.25. In addition, the American Federation of Labor understood that they were promised that the work week would be reduced from forty hours to thirty-five hours, and eventually to thirty hours. The CIO has claimed no such promises.

At this time no one knows what minimum wage increase may be recommended. The net result is considerable hard feeling toward the Secretary of Labor and considerable ill will towards the President. Mitchell is so heartly disliked that he is regarded as the outstanding unfriendly Member of the President's Administration.

It is extraordinarily interesting that the fight for a minimum wage is just as strong on one side as it is on the other. The Labor people are fighting the minimum wage reduction. The industrial units, and a number of national commercial organizations, are opposing an increase in wages. It is this conflict that makes the result at this time very uncertain, and full of fighting doubt.

This factor should be borne in mind. The new Congress in some aspects is in much the same state of uncertainty as the workers and the employers; however, there is no remote doubt that Congress eventually will vigorously support a bill to make the minimum wage increase $1.25 an hour. At least this is true so far as the House is concerned.

One of the extraordinary features of the minimum wage situation is that there are at least as many as sixty bills waiting to be introduced by Labor and by the Industrial interests. The word is, of this number, not less than thirty, and in all likelihood, forty bills, will be written by the friends of Labor. The Labor group were quite certain that they would make unusual gains in membership in the House of Representatives, and their expectations were extraordinarily successful. In the House they will show you that they have 154 Members who are definitely elected as Pro-Labor, being endorsed by both the national and the local Labor Leagues. These Labor Leagues, a part of the AFL, have developed into powerful political instruments. The Labor people also exhibit a list of twenty-nine other Congressmen who did not seek endorsement from any Labor group because they are notable in their past history for supporting all Labor legislation, and for supporting all legislation that is Socialistic in tenor.

This gives the Labor organizations a minimum total of 183 Members of the 84th Congress who can be counted, in the opinion of the Labor groups, as absolutely favorable to any Labor legislation. In other words, the Labor organizations are absolutely certain of the support of 183 Members out of a total of 435, and it is almost certain that of the balance of 252 Members the majority will vote with either the Labor or Socialist group; so, it is certain that the Labor group has an absolute domi-

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398

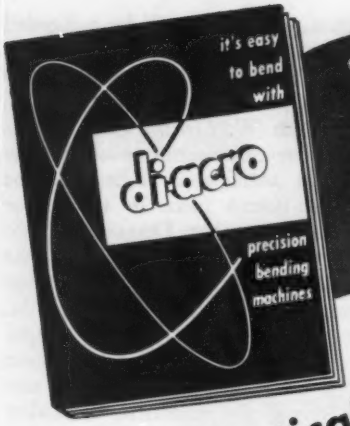
nant majority in the House and can put over any Labor legislation it really tries to accomplish.

The significance of this situation makes the Lower House of the Congress unquestionably a Socialistic mechanism of our Government. Bear in mind the very significant fact that the Labor organizations today don't care whether their friends are Democrats or Republicans. The label means practically nothing. The term Labor-Liberal is constantly growing more ordinary in use. If the present situation continues unabated it will not be long before the dominant group will either be known as Laborite or as Liberal.

In the Senate the Labor people claim the last election gave them a net gain of four Liberals. They lost their representation in some States, but on the whole they go into this Congress with a greater number of friends on the Senate side. They do not claim that as yet they control the Senate. But there is no doubt that the efforts of the Labor groups are aimed at securing the domination of the Senate in the next election, just as they have captured the working majority in the House in this Congress. The Labor Leagues and other political organizations have made it their objective to secure a Labor-Liberal Congress completely by devoting their time to the job twenty-four hours a day. They urge their members and their friends never to let up in the effort to win new followers. They have taken much of their system and many of their ideas from the British, and from other Labor and Liberal groups in different parts of Europe.

Representative Samuel K. McConnell, Jr., Pennsylvania, Republican, who was Chairman of the Labor and Education Committee of the House of the 83rd Congress, is out. He will be succeeded by Representative Augustine B. Kelley, Pennsylvania, Democrat, who would ordinarily take the place of Representative Ralph W. Gwinn (R-N.Y.) as head of the Subcommittee on Education. It is anticipated Kelley will be the most potent force in the Labor Committee. Another Democrat is expected to be a powerful leader on the Labor and Education Committee of the House, Representative Cleveland M. Bailey, West Virginia. He has a reputation for his interests in education matters, both local and national, and also is one of the leaders of the Labor groups in West Virginia. Still another Member of the Labor and Education Committee of the House is Roy W. Wier, Minnesota, Democrat, who has repeatedly been elected as the Farmer-Labor Democrat of Minneapolis. When he came back from the first World War he became an active member of all Labor projects in Minnesota and particularly as a representative of the Central Labor Union of Minneapolis. It was as an outstanding Laborite that he was elected to the State Legislature and served on the Minneapolis Board of Education.

In the Senate, Senator Lister Hill of Alabama is expected to be the champion of Labor and to lead Labor and public welfare Committees. Hill is an outstanding Democrat, a lawyer, and a member of Phi Beta Kappa. He has been in the Senate since 1938. He served in the first World War and has had an exceptionally distinguished career both at the Bar and in the Army. Other Members of the Senate Labor Committee include Senator Kennedy of Massachusetts, Senator Lehman of New York, Senator Douglas of Illinois and Senator Neely of West Virginia.



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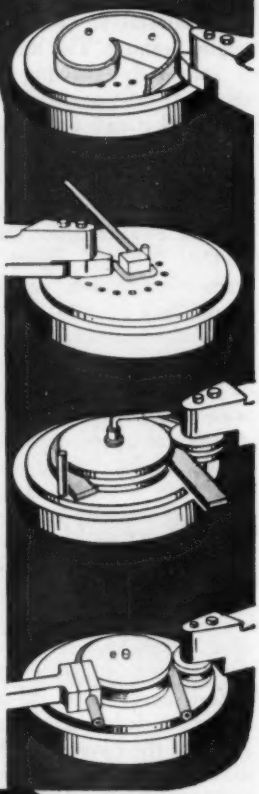

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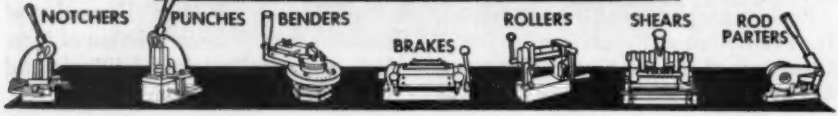

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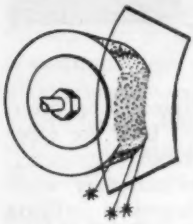
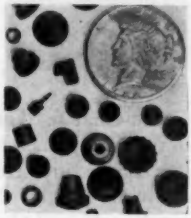
to increase your production



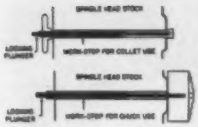
New Contact Wheel for Coated Abrasives is air inflated. It flattens at point of contact like an auto tire. Abrasive contact area is increased up to 3,000%. Wheel shapes itself to the work. Air pressure in wheel can be varied. Used on portable tools, grinders, backstand grinders, drill presses, etc. Production said to increase; improved finish. For further information encircle **N** on Action card, opposite page 64.



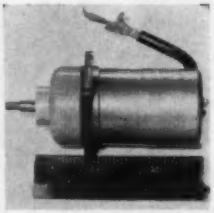
Custom Molded Rubber Parts having complex structure can be produced in miniature with dimensional tolerances as close as plus or minus .001". Among parts shown are: relief valve, seals, tone arm supports, etc. Produced by injection molding which eliminates flash and secondary operations. For further information encircle **F** on card opposite page 64.

Resinoid Bonded Disc-Wheels withstand heavy pressures and harsh dressing action. For portable grinding these wheels said to have super strength. Resinoid bond construction plus multi-layer reinforcement of fibre glass plus specially treated nylon mesh. Available in a range of grades. Encircle **D** on Action card opposite page 64.

Storage for Tool Bits is made of die cast zinc alloy with a durable finish. Will hold 70 separate bits in 3/8", 1/4" or 5/16" sizes. The bit kit will fit in the top till of Gerstner boxes, Kennedy kits and other tool boxes. The bit kit retails for $3.95. For further information encircle **B** on card opposite page 64.



Spindle Work Stop for all ¾″ and 1⅜″ spindle lathes, Quickly set up, rigidly locked into spindle, gives positive accurate stop regardless of variance in dia. of work or in positioning of collet or chuck. Available in two sets: ¾″ for ½″ collet cap.; 1⅜″ for 1″ collet cap. Each set complete for collet work and stops for chuck work. More information from **A** on card opposite page 64.



Permanent Magnet Motor, when equipped with new type gear train that reduces 1600 to 1, replaces motors several times its size. Efficient, compact, wide range gear reductions. Specially shaped and laminated field shoes. Can be used for servo-mechanisms. Motor weighs 3¾ ounces, is 2″ long. Get information by circling **G** on card opposite page 64.

Universal Taper-Boring Head may be adapted to jig borer, miller or horiz. boring bar with adaptor. Used for taper boring, taper facing, back facing, bevelling, grooving, straight and counter boring. Job remains stationary while head revolves with spindle. Body is graduated to facilitate precise and controlled cutting. Encircle **C** on card opposite page 64.

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Micro-Chuck, all purpose, universal work holding tool, eliminates many special work holding tools. Chuck and adaptor attaches directly to spindle. Face of the chuck contains boss on a slide to which work-holding attachments can be secured. Piece part is clamped to attachment. Attachment can be adjusted through 360°; boss moved up or down. Any point of piece part brought quickly to spindle center. Chuck available in 8″, 9″ and 12″ dia. Variety of attachments. Use chuck on drills, shapers, grinders, boring and milling machines. Encircle **H** on card opposite page 64

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Standard P3-2 Pantomill with special indexing knee fixture and automatic tooling.

Photo shows a standard P3-2 profiling ports in an aircraft part, a large aluminum-alloy casting. The sides of each port are parallel; one end has a true radius, the other end is parabolic. A combination of other methods would do the cutting in hours, but the P3-2, with an automatic cutting cycle, finishes each port in 2.3 minutes.

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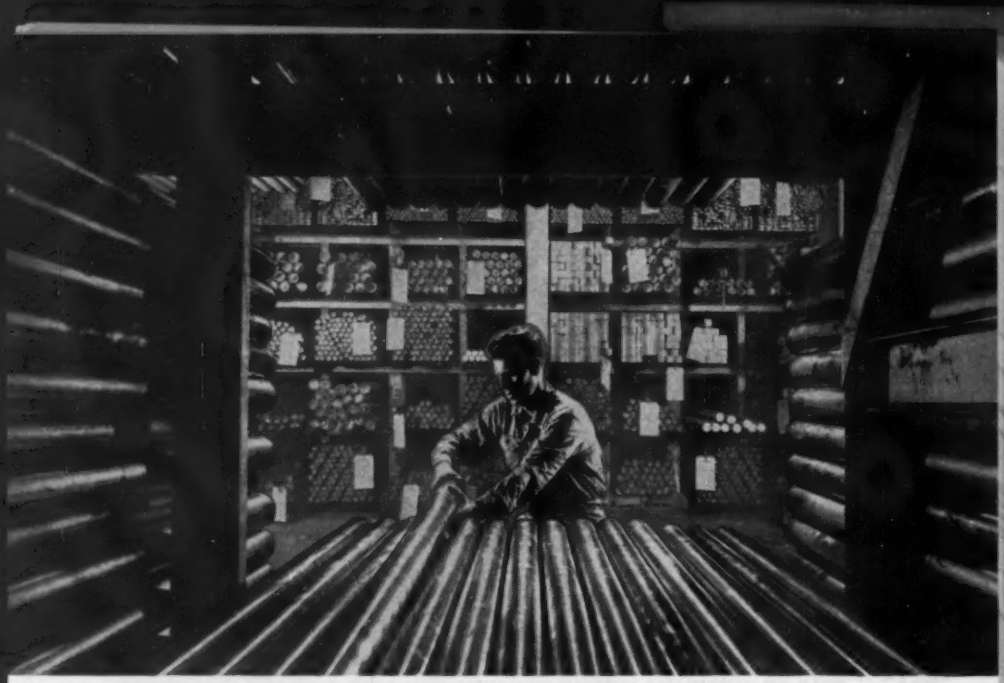

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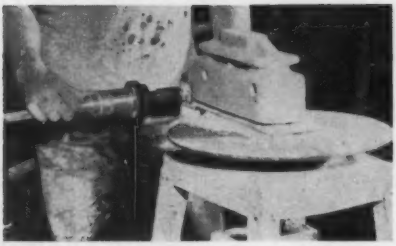
Ingenious Applications of Portable Air Tools

- *save 60 hours a week on assembly line work*
- *increases output 66 per cent*
- *maintenance unusually low*
- *applications limited only by imagination of the user*

THERE has been a marked increase in the use of portable air tools on more specialized types of work. This has been due to the need and the desire to improve production and maintenance operations from the standpoint of time and cost.

A manufacturer of porcelain products faced a twin problem in the production of porcelain fuse boxes. Excessive ware break-out and chipping caused by the slow speed of a drill operating at 2,500 revolutions per minute was eliminated by switching to a air powered drill operating at 13,000 revolutions per minute, figure 1. The second problem, securing absolute alignment of door hinge assembly holes, which had to be drilled separately in opposite sides of the fuse box, was solved through the use of a metal fixture in which the air-powered drill could safely be used, figure 2. Prior to the solution of these problems, hinge holes were drilled in the moist clay and errors in alignment could not be determined until after a two-week heat processing period had elapsed. Thus, without the fixture, work spoilage could not be discovered until the work was taken on through production.

Another example of the specialized work accomplished with air tools is found in the plant of a manufacturer of electric motors, including "sanitary" and "fancooled" types which are subject to special operating requirements. Used on such applications as dairies and food processing plants, these motors must pass rigid inspections; nicks or



1. Sharp, clean holes, free from ware breakout and chipping, are bored in this porcelain fuse box with an air-powered drill operating at 13,000 revolutions per minute. Air tool replaced 2,500 revolutions per minute tool on this application.

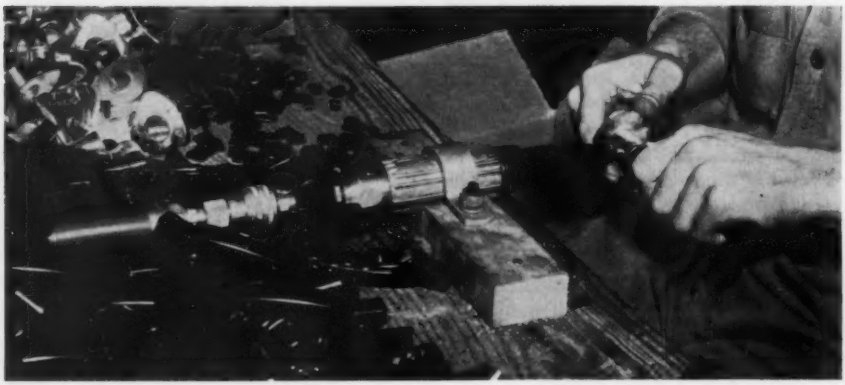
blemishes, which might possibly serve to lodge dust or dirt, cannot be tolerated. This concern uses a horizontal air-powered grinder to achieve the perfect finish necessary; compact and easy to handle, these tools permit working down into every curve and crevice of the casting for these motors.

Even older air tools come in for use on specialized applications. A little ingenuity can often save time and costs on operations which would normally be accomplished manually. A Kansas City manufacturer of power lawn mowers uses an old air drill to save some 60 hours a week on assembly line work. Test runs are made on each mower engine prior to shipment. With row upon row of engines to start, using the usual rope-pulling method, this task proved both tiresome and time-consuming. A fairly simple little fixture, figure 3, attached to the air drill, fits snugly into an opening in the engine flywheel. The tool, suspended above the rows of power mowers, is merely moved into position on the flywheel. A short burst of air and the mower engine is started, with little or no effort on the part of the tool operator, or engine starter.

Maintenance Costs

The basic simplicity of air motor design, with a very minimum of working parts, makes for little maintenance on air tools, and that low in cost. One horizontal grinder, used by a Pennsylvania foundry, required but one re-

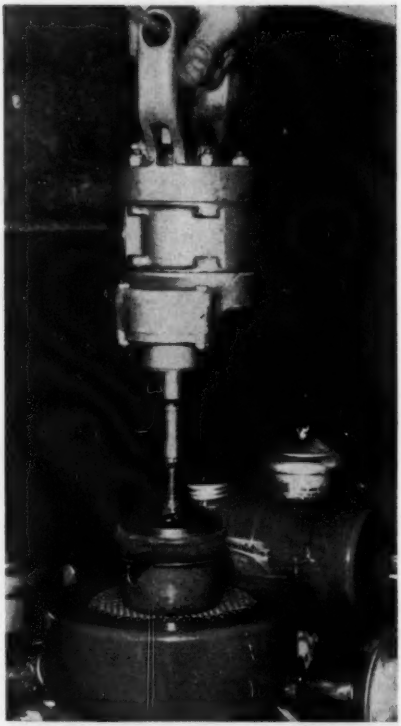
2. A simple fixture holding an air powered screw-driver increased productive output 66 per cent on an assembly operation in a plastics plant.



placement part in four years—a small spring costing just fifteen cents! An air-powered screwdriver, used for 104 weeks on an assembly line in a Chicago plant producing agricultural equipment, required repair service, including parts and labor, that totalled just $27.20, less than 6 cents per day. During that two-year period, this one air tool drove more than 500,000 screws!

Air tools, given reasonable care, will function efficiently for remarkably long periods. A sanitary enameling company in a Southern State purchased a grip handle grinder in 1929, figure 4. In constant service for more than 25 years, this tool was lubricated just once daily, in accordance with manufacturer's instructions. When this customer ordered a new grinder, he sent in the old tool for servicing. A complete check showed that three inexpensive rotor blades and a coat of paint were the only requirements for putting this tool back in the "new" class!

In the highly competitive field of plastics, one of the industry leaders has put air tools to use in cutting production time and costs on unusual applications. On an order for 120,000 plastic handles, to which metal sockets were to be attached, a productive output of 125-150 units per hour per man was running costs dangerously high. Placing two air-powered screwdrivers in simple holding devices, the production method was completely reversed, bringing the work to the tool. Assemblers held the handle and socket in their hands, placed the unit in position in front of the tool and let the screwdriver drive the screws. The switch from obsolete manual methods increased productive output 66 per cent, assuring a profitable operation.

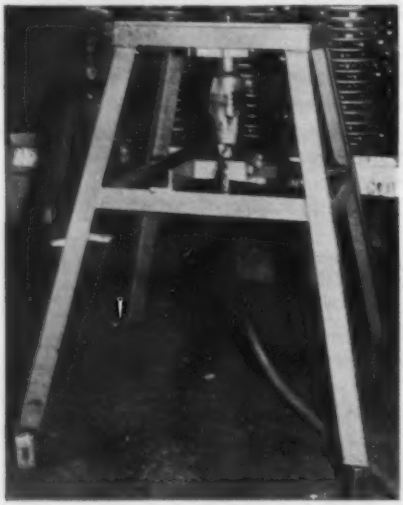


3. A new use for an old air tool! Fixture on end of this drill fits into opening on engine flywheel, provides quick, easy starting of gasoline engines for power mowers being subjected to running tests before shipment.

One example of the combined use of air tools for production and maintenance work can be found in a West Coast aircraft plant. Here, an air-powered vertical sander is used at times to remove machine marks from the tapered wing sections of aircraft, and at other times to prepare the top surface of drill press tables prior to brazing.

4. Horizontal grinder being used to finish sink casting in Tennessee enameling plant. This tool replaced a similar tool which had been in service 25 years without requiring any service.

5. This simple but ingenious device holds an air-powered grinder in rigid vertical position, speeds grinding operations on clutch plates in Indiana foundry.



An Indiana foundry turned up one of the most unusual and effective devices to save time and effort on a specialized grinding operation. A horizontal grinder was being used to remove the rough fins from the inner surface of clutch plates. The usual practice was to have the tool operator hold the clutch plate in one hand and the tool in the other. While the method was effective to a degree, it was not considered completely safe, nor was production moving as it should.

A four-leg metal stand, with four cross graces at the top supports a surface plate through which a hole was bored. The same air-powered grinder previously used has been mounted in a vertical position in this stand, with the tool spindle projecting through the opening in the surface plate. The grinding wheel is mounted on the tool spindle just above the plate, figure 5.

With this device holding the tool firmly, the operator now holds each clutch plate just as firmly in both hands, moving it in and out, rotating it as necessary, to grind off the inner diameter. Work now proceeds at a much faster rate, operating conditions are considerably safer and, as an extra bonus in savings, it is possible to use 4x1 stub wheels on this operation, reclaiming 8x1 wheels worn down on other grinding applications in this foundry.

A careful study of a production problem, a thorough knowledge of the inherent advantages of air tools, and a spark of ingenuity can often save time, money and manpower on many and varied production and maintenance jobs in metal-working plants.

The End

Photos and Data Courtesy
Compressed Air and Gas Institute

Speed Grinding of Power Steering and Breaking Rotors with Automatic Grinding Set-Up

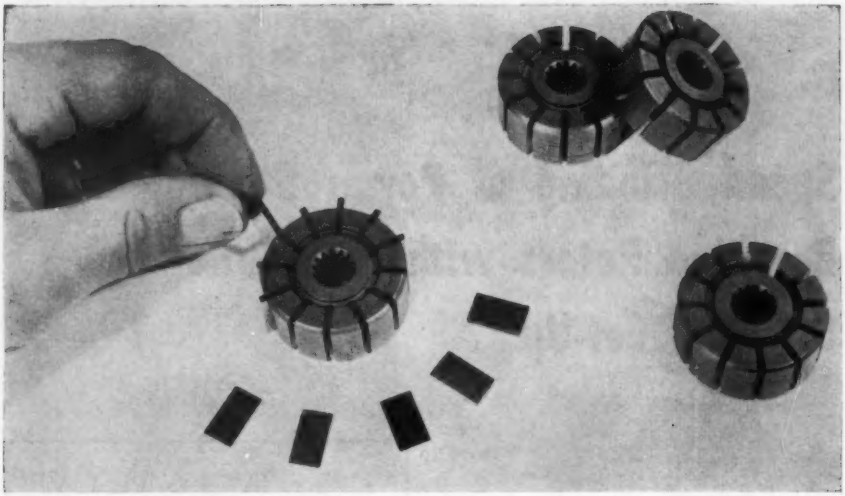
- rotors are oil hardened tool steel 61-62 Rockwell
- slots ground to .078″ plus .0005″ minus .0000
- rotors hopper fed to grinder
- automatic dressing of wheel
- 1000 slots ground per hour

PROBLEMS encountered in producing power steering pumps at a relatively low cost were the basis for a unique automatic grinder. The rotors are used in vane-type pumps for automotive power steering and power braking. Twelve slots in the rotor hold the vanes illustrated in figure 1. The quality of fit and finish is important to pump efficiency making a lapped finish desirable. Since it was economically impractical to finish the milled slots by lapping, plunge grinding on an automatic basis was the answer.

The rotors are manufactured of oil hardening tool steel and prior to the grinding operation, the slots are milled, the rotor is hardened to 61-62 Rockwell "C" and the rotor faces are lapped to achieve proper part thickness and finish. The slots, then finished on the grinder, are held to .078″ plus .0005, minus .0000 with a resulting surface finish of 5 to 10 micro-inches RMS.

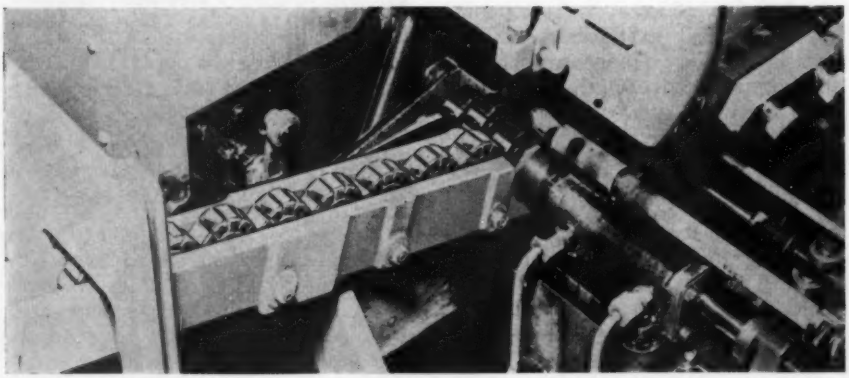
Rotors are hopper-fed to the grinding wheel and each slot is in turn indexed and "located." Its center is aligned under the center of the wheel face. In making its rapid plunge to finish the slot, figure 2, the wheel grinds off equal amounts from both walls, equalizing pressure and wear on both sides of the wheel. This affords better control of wheel and slot dimension.

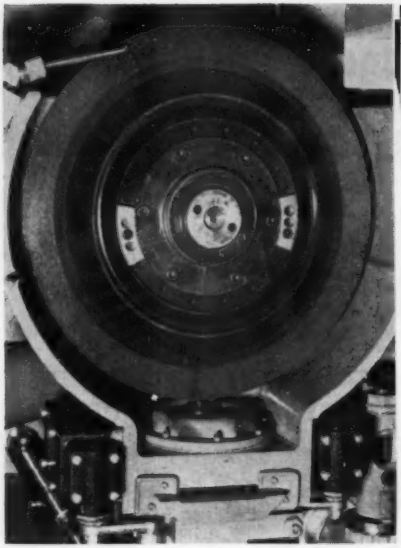
An automatic diamond wheel dresser dresses the wheel after the twelve slots of each rotor have been ground and also lowers the column to compensate for wheel depth lost in dressing,



1. Close-up of the rotors finished on the automatic grinder. Deceptively simple, the part requires finishing of both faces of each of the twelve slots. Slot width is held to seventy-eight thousandths plus 5 ten-thousandths minus 0. Resulting surface finish is between 5 and 10 micro-inches RMS.

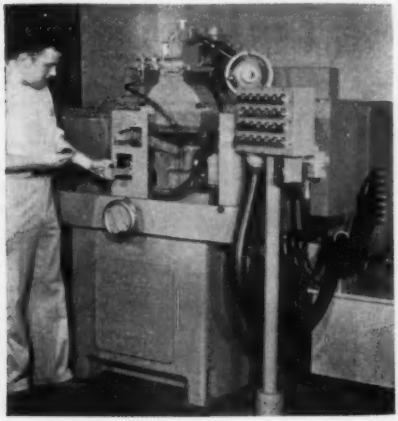
2. Side-front view of the automatic rotor grinder showing the hopper feed arrangement. Each slot in a rotor must be accurately located so that its exact center is aligned precisely with the center of the wheel face. After 12 "grinds," the finished rotor is ejected and a new one rolls into place.





3. Wheel housing removed on the rotor grinder showing the diamond dresser above the wheel. Dressing is automatic after a predetermined number of "plunges" and the column is automatically lowered to compensate for wheel depth lost in dressing.

4. The Automatic Rotor Grinder.



as depth of slot must be maintained, figure 3. The result—1000 slots ground per hour.

Heat exchangers in the coolant system keep the coolant approximately at room temperature, i.e., the temperature of the rotors before grinding, thus eliminating variations in slot dimensions.

A secondary dressing operation is incorporated by which a new wheel is trued to the desired thickness. The machine is shown in figure 4, and was designed by the DoAll Co., Des Plaines, Ill.

The End

"For the last time . . . you don't have to follow me up."

Don't forget to mention MACHINE and TOOL BLUE BOOK when writing advertisers, or use the handy Readers' Service card opposite page 64.

You Can Save Time and Money by Bending the Elbows in Large Size Conduit

By **Oscar Kosbohn,** Superintendent
Magaw Electric Company
Milwaukee, Wis.

BY BENDING CONDUIT WE . . .

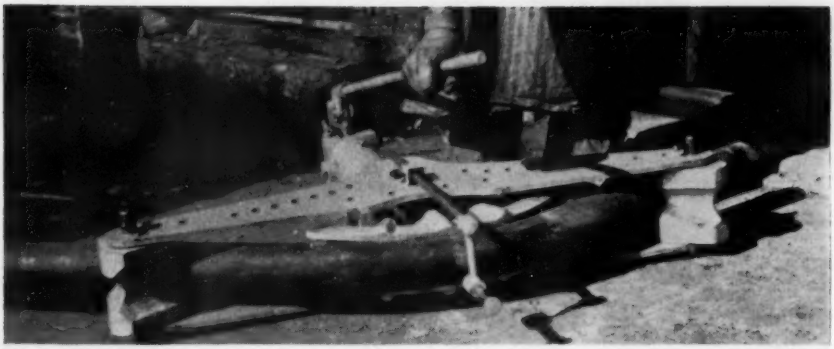
- **saved $438.56 in materials**
- **saved 427-1/3 hours of time**
- **saved labor cost of 427-1/3 hours**

WE made 621 90 degree bends in the electrical work we completed in the 38,759 square foot, two story Shop and Technical Building of the Milwaukee Vocational School. By bending the conduit, we saved $438.56 in materials, 427-1/3 hours of time, and the labor cost for that time.

The table that follows shows the difference in time required between the use of elbows and couplings and what bends required. And keep in mind that these are 90 degree bends only.

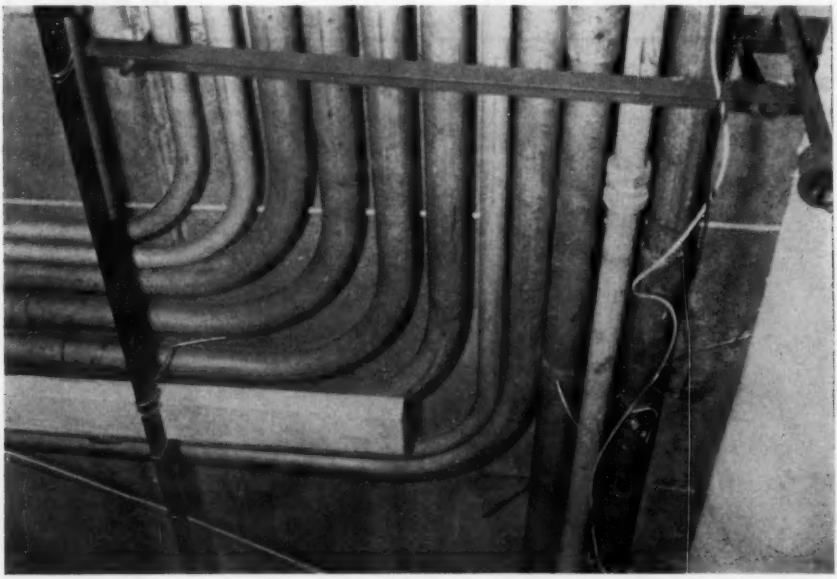
Actually, this doesn't tell the whole story, but since you probably already make bends up to 45 degrees, emphasis is placed on 90 degree bends. Considerable additional savings were re-

	EMT			RIGID CONDUIT				
Hand Bending, Measuring, and Installing	1¼"	1½"	2"	1¼"	1½"	2"	2½"	3"
Time (Minutes)	30	40	45	35	45	50	60	60
Measuring, Cutting and Threading with Power and Installing Elbows and Couplings								
Time (Minutes)	75	75	75	75	75	75	90	90
Time Saving per Bend **(Minutes)**	45	35	30	40	30	25	30	30
Number of Bends	195	220	106	18	40	32	4	6
Total Saving (Hours)	146	128	53=	12	20	13½	2	3=
			327 hrs.					**50½**



A 90 degree bend is made in one single setting. No moving of the pipe is necessary.

These streamlined bends, which will be concealed, are giving an extra measure of pride in a job well done. They are not pieced together, but facilitate to a great extent the pulling of wires. They are installed at considerably less cost than with couplings and fittings.

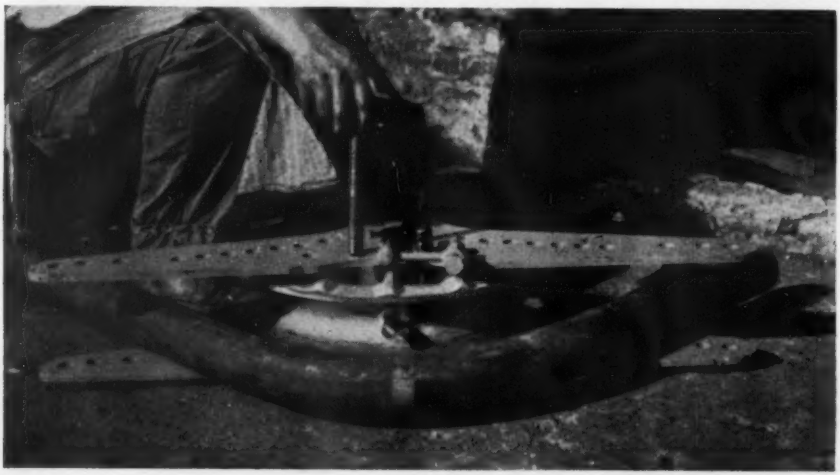


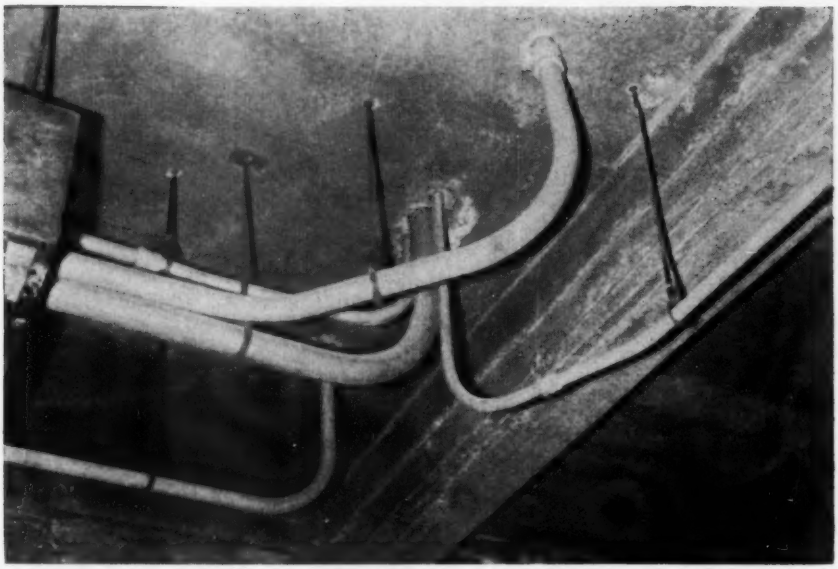
alized when we made 45 degree bends and offsets and bends down to 10 degrees. Taking them all together for the sake of brevity, in thin wall, we made 220 in the 1¼"; 206 in the 1½"; and, 48 in the 2". In the rigid conduit, we made 24 in the 1¼"; 19 in the 1½"; 60 in the 2"; 11 in the 2½"; and, 15 in the 3".

That shows the time saved, so now let's take a look at the costs of the materials. The following table first shows what it cost us to make the bends, then what the elbows and couplings would have cost, and finally the savings.

Size Used	Tube	Price per 100 ft.	Tube Cost per Bend	Cents Cost per Elbow	Cents Cost per Coupling	Total Dollar Saving	Saving per Bend	No. of Bends 90	Total Saving
EMT									
1¼"	19"	27.00	0.42½	42½	50	0.92½	.50	195	97.50
1½"	22"	33.00	0.60½	57	70	1.27	0.67½	220	148.50
2"	25"	44.00	0.91	1.04	100	2.04	1.13	**106**	119.78
								521 BENDS	
RIGID CONDUIT									
1¼"	19"	30.21	0.47½	60	21½	.81½	0.34	18	6.12
1½"	22"	36.18	0.68	84½	27	1.11½	0.43½	40	17.40
2"	25"	48.24	1.05	136	37	1.73	0.72	32	23.04
2½"	27"	76.09	1.71	242	73	3.15	1.44	4	5.76
3"	33"	99.65	2.74	508	107	6.15	3.41	**6**	20.46
								100 BENDS	

Shoe with pipe fastened to frame, and pipe pushed out of shoe with push-out pin.





Here's proof of what the right type of bender can do. Thin wall or rigid conduit, 1¼" or 5", perfect degree bends and offsets. Several of them in one length of conduit, as shown, can be made with ease in record time.

These figures leave little doubt that there are considerable advantages in making 90 degree bends, especially in rigid conduit. Then why are 90 degree elbows and couplings still used?

The answer to that might be in having the wrong idea of what it takes to make 90 degree bends. Before anything else, you have to have the right type of bender—one that will allow bends to be made in one setting and one that turns out identical bends. We use Tal Benders because we've found that with them we can obtain perfect bends of any degree in one setting in a matter of minutes with all guess work and calculation eliminated.

They consist of a small hydraulic ram built into a light frame work with the two easily separated for movement around the job. This frame work has adjustable corner formers to accommodate various size conduit and to afford a selection of radii for bends. An assortment of half circle forming shoes is provided to fit each size of conduit.

The conduit is placed between the forming shoe and the corner formers, the operating handle of the hydraulic ram is stroked and the conduit yields. When the proper degree of bend has been made, as indicated by an indicator, the release handle returns the ram to its original position, and you are all set to make the next bend.

To make offsets, merely insert the

Assembly of the bender is simple. Only two main parts: The hydraulic unit and the frame are put together in less than one minute with a U key.

conduit from the other side with the bent section pointed away from the operator and pump the hydraulic ram to the degree of the offset desired.

We made a total of 621 90 degree bends, 521 in thin wall and 100 in rigid conduit, plus making 45 degree bends and offsets while utilizing only three 90 degree elbows and couplings.

Another advantage to bending is the streamlined appearance of the work. There's no hodgepodge of conduit joined by couplings with a pieced-together look. Bent conduit presents a smooth, unbroken appearance, that gives you an extra measure of pride in a job well done.

We've been considering a job here that is larger than most, so that we could give you a factual example and concrete figures, but the same advantages are to be had on the smallest job. Just one 2 inch 90 degree bend in rigid conduit saves you 25 minutes in time, plus labor cost and 72 cents in materials.

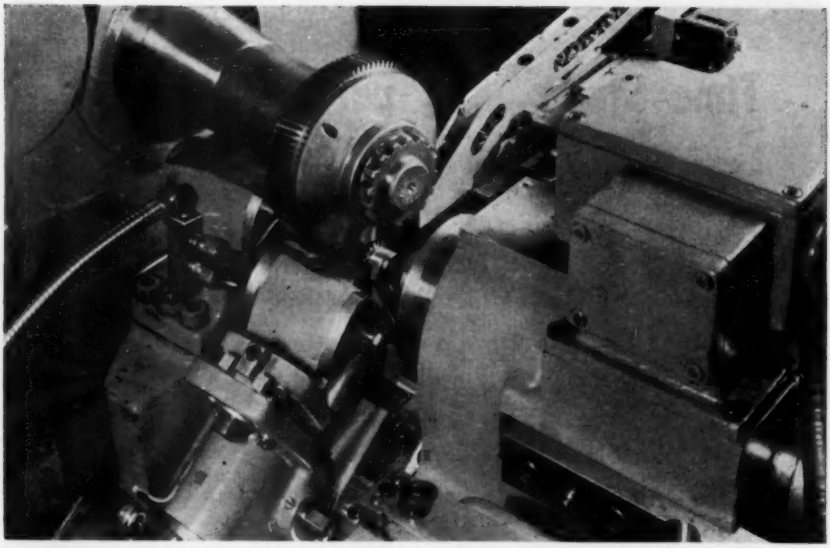
The End

Automatically Operated Shaving Machine Chamfers and Shaves Automotive Pinions

ACCURATELY controlled chamfering of the tips of the teeth of automotive pinions at the same time the teeth are being shaved is accomplished with a No. 8 Fellows "Full-tool" Gear Shaving Machine tooled for fully automatic operation. Two tools are employed, the shaving tool and a rotary serrated-tooth chamfering tool which is located on a movable slide below and at the left of the shaving tool. An air cylinder automatically advances and withdraws the chamfering tool slide in timed relation with the shaving cycle.

In production, the pinions roll down a chute from an automatic feeding device and drop, one at a time, into a carrier. An air cylinder moves the carrier to the position where the pinion is loaded on the work arbor. When this point is reached, a micro-switch operates another air cylinder bringing the work arbor forward through the hole in the pinion to locate and clamp it for shaving and chamfering. The carrier is then drawn back to receive the next pinion.

As soon as the carrier is back in its

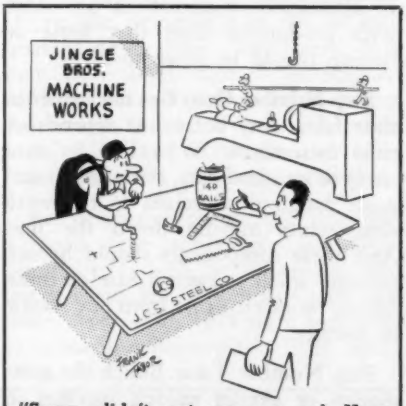


Close-up of the shaving and chamfering tool which chamfers the tips of teeth of automotive pinions while the teeth are being shaved. Operation is fully automatic, as is loading and unloading. Air cylinders actuate tool slide.

starting position, the shaving tool starts to rotate; the depth feed cam on the machine raises the pinion to the previously set center distance for shaving; and the chamfering tool slide is advanced to bring this tool to its preset center distance with the work. The chamfering tool is wider than the pinion and is not traversed.

After the first pass of the shaving tool across the pinion, the chamfering tool is withdrawn from the work and the direction of shaving tool rotation reversed for the second pass across the pinion. As soon as the second pass is completed, a recess in the depth feed cam allows the pinion to drop slightly from the shaving center distance, the arbor is withdrawn and the pinion ejected into the unloading chute. Another pinion is then loaded and the sequence of operations repeated.

The End



"Sorry, didn't get your name! New around here?"

Time Study . . . part 7
Incentives, Methods

Balancing the Production Line
Keeping Time Studies Up to Date
The Old Marginal Operator
Correcting a Loose Rate Structure

By **Harold R. Nissley**, P. E.,
Cleveland Heights, Ohio

Balancing the Production Line

"HOW do you balance the line when several units or models are going down the line at one time?" This is another $64 question; however, the problem is sufficiently common in all shops with production lines that some attention should be given to it.

Step Number One: Get the elemental time facts. Any balancing depends on time increments. Whether by time study or standard data, a "line balancer" must assign time values to the work components moving down the line. And these components should be sufficiently small to permit ease of transferring work elements from one station to another.

Step Number Two: Bunch the same models or similar models together in one production run. Many job shops will run the same jobs or model numbers several times a week through the shop. This is very costly, whether considered in the light of assembly lines or machine setups. To avoid this a system of production planning should be set up that will group like jobs together and thus minimize frequent change-overs. Thus, if jobs A, B, C, D, E, F, and H are run three times a week, it would seem like ordinary common sense to run each job, if at all possible, once a week by proper scheduling and routing based on a broad plan of production control. Hence, there would not be several models going down a production line at one time (unless the line were unusually long or the model runs very short).

Step Number Three: Establish side track conveyors. Let us assume that a good job of timing has been done and that models have been bunched

together to avoid tool change and other interruptions. Regardless of how good a job has been done in these two important respects bottlenecks do develop. And when they develop 90 per cent of a production line force can be idle while 10 per cent work feverishly trying to get the stuff moving again.

The new Ford Engine Plant at Cleveland (and other plants) have taken care of this situation by introducing side track conveyors at certain intervals along the assembly lines. As trouble develops at one point, the "trouble-makers" are pushed aside onto "side-track" conveyors. These troublesome parts or models are worked on as time permits and then are put back onto the main assembly line again ready for the next operation. Some shops employ a regular corps of roving "bottle neck" operators who work on these side-tracked models until they are ready to go again.

But this applies to "trouble-makers". What about those situations where different models must move down the line at the same time. Well, a similar plan might be worked out (and has been worked out in some shops). In the extreme situation each operator has a side track or side conveyor. Each operator will then work on his model until he has finished his work on it. Then he pushes the model onto the main conveyor line where the next operator side tracks it to his work center. Thus the side tracks take up the slack in the main conveyor line which, theoretically, is full at all times and which, theoretically, permits every-

Bottleneck Operators

one to work at top potential along the entire line.

Keeping Time Studies Up to Date

The basis for incentive creepage in most incentive shops today is failure to keep time studies up to date. But the failure goes even beyond the periodic checking of jobs and their work content. The failure usually starts with a hastily written time study which may be defective in a number of respects; the elements may not be adequately described; insufficient data may have been taken; the original time study may have been taken during the initial run of a new job when tools, lubricants, materials, and operator skills were not fully developed.[1]

Let us assume, for the moment, that a good time study job was done originally. Indeed, let us assume that an excellent job of standard data was done when piece rates were originally installed in a department. Even under

[1]For a fuller discussion of the inadequacy of the single time study see the writer's article in the March, 1954 issue of the MACHINE & TOOL BLUE BOOK, "How to Make Your Time Study Standards More Accurate and More Salable."

Keep the time studies up to date

these technically correct and ideal conditions standards and rates can get out of line unless properly policed.

What happens, of course, is that operators and/or supervisors and/or designers change tools, lubricants, materials, quality standards, and other factors without saying anything to the time study department. And regardless of how much fuss anybody makes about these failures to report job changes they continue to occur and disrupt the earnings structure. Management, of course, only hears about those cases which adversely affect operator earnings; and there is only one direction piece rate changes stemming from grievances go—**upwards.**

Because this problem is not new to American incentive shops, many industrial engineers have found solutions or partial solutions to it. These solutions are suggested in part from the foregoing discussion: (1) Carefully define tools, machine speeds, and elements in original time studies; or better, set up a system of good standard data based on well defined elements. (2) Re-check jobs at least once a year; this has other advantages besides bringing job work content up to date (e.g. methods improvements possibilities of the old job should challenge the imagination of the time study engineer).

Regardless of how carefully defined the elements were in the original time study or standard data some engineers have come to believe the old proverb, "One picture is worth 1000 words." They are going all the way from single 35mm. still pictures of a job design (and affixing this picture to the original time study) to three dimensional pictures which portray the job as life-like as it is possible to portray in a still picture. One firm has thousands of short moving pictures of every job they have put a piece rate on. These $3 to $10 moving pictures are used: (a) In selling the standard originally; (b) in checking on the job later to detect job changes; (c) for methods improvements; and (d) for very fine time values (as low as 0.001 minute compared with the accuracy of the conventional stop watch technique which seldom goes below 0.05 minute).[2]

Pictures, whether still or moving pictures, take time and are not cheap. But grievance sessions and arbitration take time and are not cheap. And once an incentive system gets out of kilter you don't go back into shape again quickly and easily. So it is a matter of balancing one set of times and costs

[2]For a fuller discussion of the movie camera in standards work, the reader is referred to the writer's article in the September, 1951, issue of the MACHINE & TOOL BLUE BOOK, "Using a Movie Camera in Setting and Selling Production Standards."

against another. Unfortunately many companies will permit the creeping paralysis of grievance sessions to overcome them before exploring some of these other newer techniques.

The Old Marginal Operator

"What do you do with the older marginal operator who becomes the bottleneck in a production line or group incentive pool?"

Various occupations have different job requirements—physical and mental. Take the extreme case of the professional boxer. The percentage of boxers making a decent living beyond 30 years of age is very small indeed. But anyone entering boxing as a career knows this—or should know it; hence the smart boxer latches onto as much purse before 30 as possible—and then "retires" to an automobile production line!

This operator problem of failure to keep up with the production line is not much different than the problem a company has of a foreman who can no longer run his department—but who has five more years to go before retirement. The foreman may still be physically hale and hearty; but his temper is short, his housekeeping and safety are poor, and his quality and production are "lousy".

Fortunately for American workmen jobs have become easier as companies have shown more interest in labor-saving devices. One of the reasons for men living longer today than their grandfathers is they don't have to work as hard.[3] Notwithstanding these labor-saving gadgets, industry does have the problem of the depreciation of the human machine just as it has with the machine tool. The unions have long recognized the problem and would like to increase the fund(s) for operator obsolescence.

The marginal operator

The problem is handled informally in some shops by the younger and stronger men voluntarily handling the more arduous parts of the job. But there is, of course, a limit to this. Moreover, not all young men are motivated by the altruism of helping their elders.

There are several solutions to such problems, not one of which is clean cut. These solutions or combinations of them will depend on the particular circumstances: length of operator service; other talents possessed by the marginal operator; tight or loose labor market; over-all value to the company during the operator's length of service; etc.

---

[3]A few years ago the READERS' DIGEST contained an article by an eminent surgeon who had made a study of men with broken legs. His study revealed that men who had broken their legs lived 10 years longer than men who had not had this "good fortune." He explained his unusual discovery in this way: Men with broken legs are completely immobilized for so many weeks they catch up on much needed rest and relaxation which their "less fortunate" male companions never have a chance of doing.

Bolstering a loose rate structure

1. Try to salvage the operator on the job. What is job success? Certainly one important criteria is keeping up with production quotas. But there are other important criteria: Quality of workmanship; attendance; and cooperation, to name a few. A company can afford to compromise its production position in instances where these other factors are high. Just stop to think how much time is lost in the shop on re-worked materials (and how much good will is lost in the field when retailers and consumers have difficulty with your defective products). Consider all the costs involved in re-shuffling men due to production line absences. Which answer do you prefer when a rush job comes in at 5 o'clock: "I got a big date with my best girl" or "I was going to take the family to a movie but I'll call home and tell them I'll take them some other night."?

2. Ask the Personnel Department to find the operator another job. Let us assume that you have considered all of these other job factors. Let us even assume that in these other factors the slow operator is no better than the high producers. A good Personnel Department will accept such a problem as a challenge and will either find a job for the man within the company (at something near the same pay, if possible) or will help the operator to re-locate. But the problem is not entirely a Personnel Department problem; it is a company problem that must be solved by everyone: the operator, the foreman, the superintendent, the union officers, and the employment manager.

3. Give the operator a generous severance pay allowance. Because most operators would rather have a job than a generous severance pay, this third choice should be reserved for situations in which the first two alternatives above fail. But firms have been able to work out satisfactory arrangements under a given set of superannuation circumstances. They range all the way from semi-retirement arrangements (e.g. plant guard) to an outright payment of so much money based on years (and caliber) of service. A common figure for this last is one week of severance pay for each year of service; thus an operator with 10 years of service would have 10 weeks to find another job before he would lose any income whatever (after that his unemployment compensation would carry him, in part, for 26 weeks).

But even a generous severance pay allowance should not relieve a company of trying to help an operator get relocated—especially if the operator's record is good. To be sure most of the responsibility rests with the operator for getting himself another job; but the responsibility is not, in the opinion

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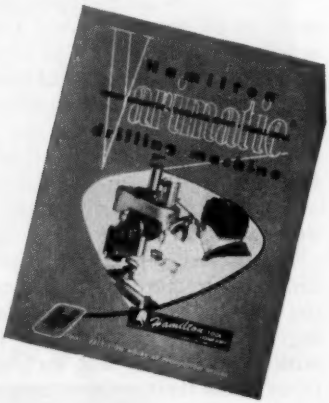

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of the writer, the entire responsibility of the displaced operator.

Is There Any Way That a Loose Rate Structure Can Be Corrected?

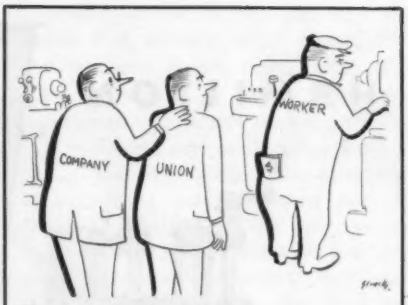
Granted a poor job of industrial engineering has been done or for other reasons a lopsided earnings structure has developed. People who are supposed to be earning $2.00 an hour are earning $4.00 (while others working at top speed are only earning $2.00 an hour).

Such a situation is not only bad for a company, it is also bad for a union. The pressure is constantly on both company and union to loosen rates so that the people on the lower end of the earnings scale get more. And it is worth anyone's life to tamper with the rates at the upper end—the $4 rates!

A few companies have tried the clumsy approach of effecting some methods changes on these loose jobs, re-timing the entire job, and setting a new rate on the job that will just yield $2. Such approaches either end up in a strike or in a general slow down.

A much sounder approach would seem to be that of calling a meeting with the Union officers to explore the problem. These men, likewise, are troubled with this same problem; but they don't know what to do with it. They are constantly pestered by the $2 boys to get them more money. After all the $2 operators are paying as much dues as the $4 operators.

Because, therefore, an incongruous earnings structure is a problem with the union, most union officers are willing to discuss this common problem with management. But the union officers know their problem may become



Three groups must gain

even greater, if management approaches them with the proposition of taking anything away from the $4 earners and adding it to the pay of the $2 earners. Any proposal, therefore, must maintain much of the status quo in it **and** at the same time narrow these differentials **and** at the same time keep within payroll budgets! This becomes a real problem as all of these checker board gamuts are considered.

There are a number of ways of solving this complex problem. The two which the writer prefers are: (1) Concentrate upward wage adjustments (at contract negotiating time) on the low paying jobs. (2) Negotiate a Quid Pro Quo Agreement.

1. Make proper adjustments at contract time. This plan in effect says this: "Instead of giving everyone 6c an hour more this next year, we will give a bulk plant increase to be distributed in such a way as to narrow inequities." Thus the $4 earners might receive little or no increase in the new contract; and they would continue to receive little or no increases as annual raises are negotiated until such time as the lower paid operators come within 10 per cent of them (or some other indicated percentage). This approach

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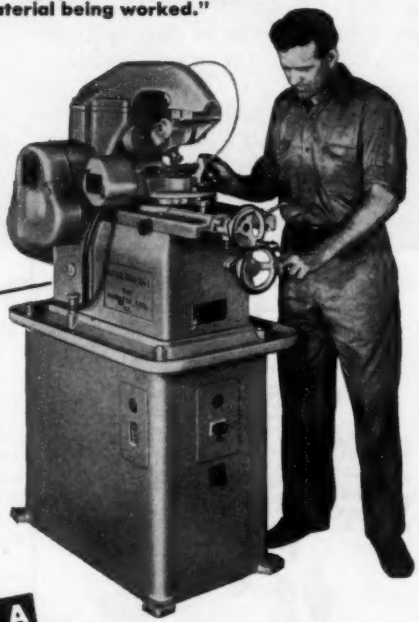

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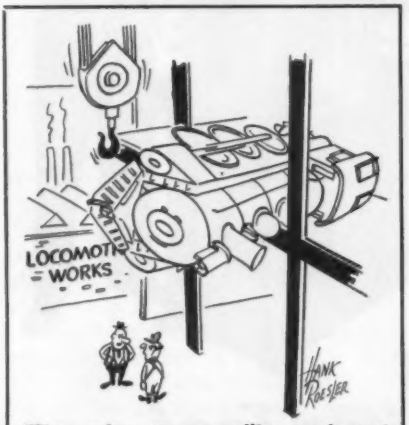
probably would have easier sailing, if the $4 earners did get something out of the new negotiations but less than half as much as the $2 earners.

2. Negotiate a Quid Pro Quo Agreement. Agree with the union that some rates may be somewhat tight and others are obviously loose. But it is not the company's intention of increasing their direct labor costs by loosening tight rates without some relief on the loose rates. However, there are very few union officers who can leave a conference room and tell their constituents on the production floor that, in the interest of equity, high earnings must be cut in order that the men on the other end might get wage relief; such an approach would seem like asking the $4-an-hour-men to chip in $1 per hour every pay day to help the $2-an-hour-men.

But there is a way out of this psychological dilemma. Propose to the union, on a quid pro quo basis (i.e. for every tight rate you loosen you tighten a loose rate), that any tightening of loose rates will not apply to the present job incumbents. In other words, the new rates will only apply to present job holders, if these rates are in favor of the job holder; if the rates do not favor the job holder, the old (loose) rate will continue as long as the present operator continues to hold the job. As soon as a loose rate job becomes vacant, the new (fair) rate will apply; and this new rate will be pointed out to all who bid for the job—pointed out both verbally and in writing.



"Since when are we selling equipment on the 'Lay-Away' plan?"

Under such a plan, of course, a company stands to lose a little money for the first few months the plan is in operation. It will lose by the amount by which so called tight rates are loosened without corresponding immediate tightening of loose rates. But this should correct itself within a year as men move from old lucrative jobs and new operators come in to fill their places.

Thus, intelligent and enlightened management can correct an incongruous earnings structure, if (a) it will give as much attention to some of the union problems as it does to its own and if (b) it will take the union into its confidence when exploring the possibilities of such a problem that affects men's pocket books.

Conclusions

The three ingredients necessary for balancing a production line are: (1) Get the elemental time facts; (2) group or bunch the same or similar models together in one production run (instead of running the same model or parts several times a week or a month); (3) set up side track conveyors whereby troublesome parts or models can be shunted to one side until a later and a

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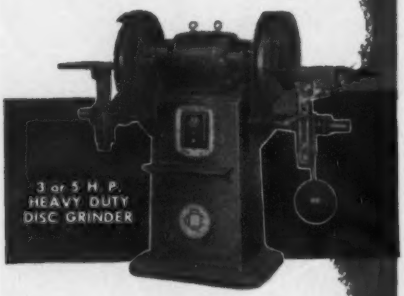

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more convenient time to work on them.

Time studies can be kept up to date if (a) a good job of time study (or standard data has been done originally; if (b) a good job of reporting job changes has been done; if (c) still or moving pictures are taken of the original job designs; and if (d) all jobs are re-timed studied once a year to detect changes in job content and to accelerate job improvements.

The problem of the marginal operator who cannot keep up with the rest of the line (or pool) is a difficult one. The obvious first attempt should be that of trying to correct either the operator's physical defects (eyes, hernia, flat feet, etc.) or to correct whatever defects there might be in the job design. The next step is that of leaning heavily on the Personnel Department to find the operator another job (within the company, if possible). The final step is that of giving the operator a generous severance pay allowance and help him re-locate, if at all possible.

The loose rate problem can be handled with satisfaction to all parties concerned, if a mixture of common sense and Golden Rule philosophy is applied to the problem. **Three** groups must gain. The Company must gain by fewer grievance sessions and regaining control of their direct labor costs; the union officers must gain by "doing something for the fellows at the lower end of the earnings scale"; and the "underpaid" operators gain by ultimately catching up on the overpaid operators (and the latter must be kept happy by allowing them to continue their ride on the "gravy train").

End of Part 7

POP'S school of filing
GULLIBLE GUS HEARD POP SAY NICHOLSON CURVED TOOTH FILES HAVE UH SMOOTH SHAVIN' ACTION
--AN' THAT THEIR TEETH IS "RAZOR SHARP"!
--SO HE'S TRYIN' ONE OUT ON THEM WIRE-BRUSH WHISKERS O' HIS. HAR!!

Gus isn't far wrong. Nicholson Superior brand Curved Tooth files *do* have a fast, smooth-cutting "shaving" or shearing action on everything from annealed tool steels to aluminum and plastics. Here are some of their features that save workmen's time:

Milled **(not chisel-cut) teeth of almost unbelievable sharpness.**

Just-right radius and spacing to keep at least two teeth in "non-chatter" contact with work.

Teeth face-angled for good bite, with smoothly rounded gullets to minimize clogging.

Nicholson Superiors come in a full range of popular types and shapes for a wide variety of uses. *You can't beat Nicholson Superior.*

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BARBER COLMAN

Announcing

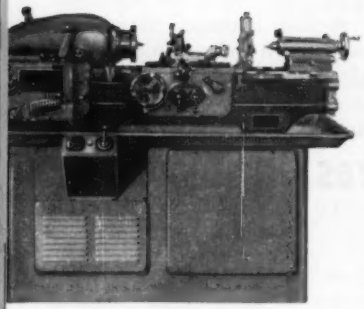
the Hendey machine division *of*

BARBER-COLMAN COMPANY

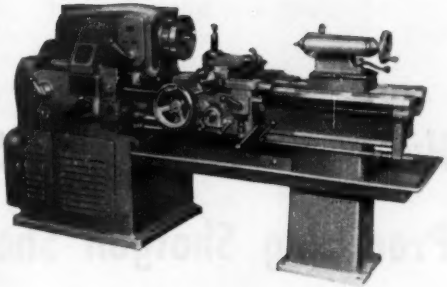
The manufacturing rights for the products of the Hendey Machine Company have been acquired by Barber-Colman Company. Hendey toolroom and production lathes and Hendey shapers will be manufactured by the Hendey Machine Division of Barber-Colman Company at Rockford, Illinois.

Barber-Colman will manufacture these lathes and shapers with all the special skills and techniques which have made its gear hobbing machines and hob sharpening machines of such outstanding quality. Users of Hendey machines will be afforded the same excellent service which Barber-Colman has always extended to its customers.

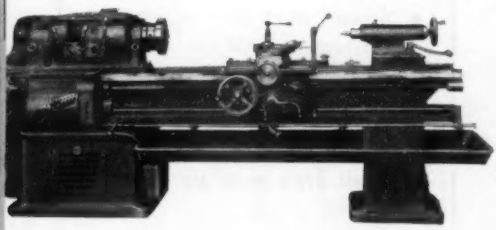
For further information about Hendey lathes and shapers, call your nearest Hendey representative or write to the Hendey Machine Division, Barber-Colman Company, Rockford, Illinois.



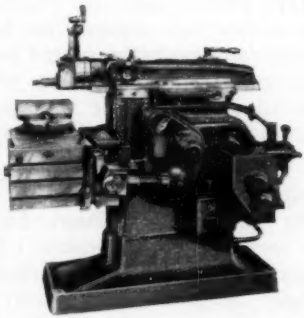
9" Tool and Gagemakers' Lathe



No. 2E General Purpose 14" Lathe



12", 14" and 16" — 18 speed Geared Head Lathe



12" High-Speed Shaper

Hendey machine division

BARBER COLMAN

BARBER-COLMAN COMPANY

211 LOOMIS ST., ROCKFORD, ILL.

Hydraulic Press Jack Solves Problem of Producing Shotgun Shells

- *as much as 25% wastage resulted in making shotgun shells*
- *humid, wet days affected operations*
- *hydraulic press bed jack was designed*
- *accumulator supplies constant high pressure supply of oil*

By **Dayton Rogers,** President
Dayton Rogers Mfg. Co.
Minneapolis, Minn.

THE Federal Cartridge people needed a solution to a problem that had been with them since they started producing shotgun shells, a problem which resulted in considerable wastage (sometimes up to 25 per cent per day).

In the manufacture of shotgun shells paper wadding is employed in supporting the primer cap insert. This paper is measured out accurately, rolled and inserted under mechanical means (specially designed punch press) in the brass shotgun shell head. Climatic conditions, such as humid or wet days, affected the density of paper composition so that the overall mass of the paper inserts was larger than the required amount for accurately supporting the primer inserts. This increased bulk had the tendency to increase the flange of the shellhead ("x", figure 1) since the force necessary to sufficiently compress the wadding exceeded the press capacity and sprung the press.

This increased width of the flange made the shell defective and it would not fit the magazine of the shotgun.

We had been designing hydraulic press bed jacks to control depth of marking on a stenciling operation to a

plus or minus .002" and we felt we could use the same equipment to take care of the increased mass of wadding paper by retreating the necessary distance after a preset tonnage had been attained, allowing the die to close properly and insuring the flange thickness to be uniform on every shell. Variations in wadding height would then be taken on the inside of the shell where height was not a problem.

The system was set up as indicated in figure 2. Since the movement of the press bed jack, when relieving was, very small (1/32" max.), an accumulator was added to the press so that a constant high pressure supply of oil would be available at all times. The pneumatic pump supplied the accumulator with necessary oil, with reverse flow being prevented by a check valve.

The End

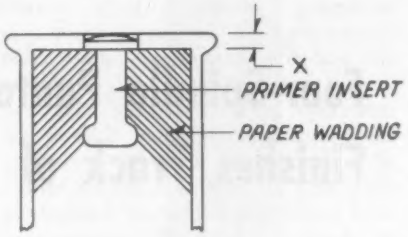
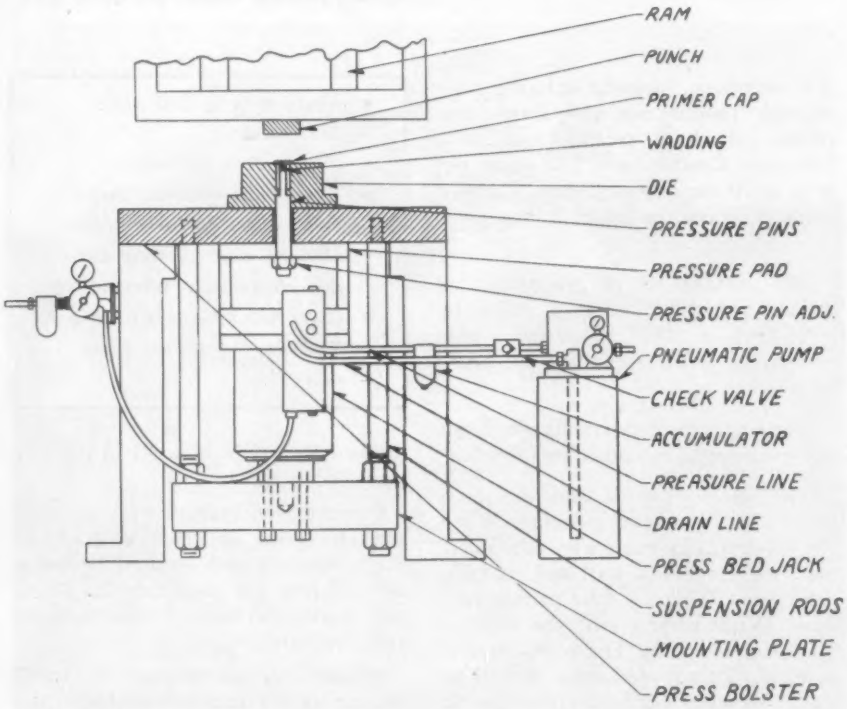


Figure 1

Figure 2



Four-Spindle Pantograph Roughs, Finishes Track of Irregular Radii

AN ingenious 4-spindle indexing pantograph roughs out and finish machines a track of irregular radii in a fuse cam. Production is 240 pieces per hour at 70 per cent efficiency. The machine is shown in figure 1, the piece part in figure 2.

The dimensions of the track, or groove, are: .1903″ wide + .0014″ by 109″ deep + .003″; location is plus or minus .001″, finish is 35 micro inches.

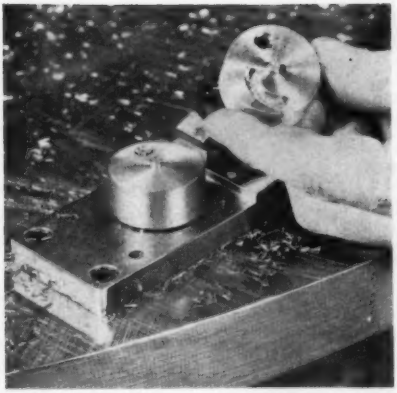
The first two pantographs rough out the track while the other two finish.

The operator loads and presses a button for automatic indexing. When the table is automatically positioned, the pantograph will start and cut radii cam track. When all four pantographs have finished their cut, the table is ready for indexing. The pantograph is actually laterally fed into the direct path and when cut is completed, withdraws rather than lifts out in the conventional manner.

- *Production is 240 pieces per hour*
- *70 per cent efficiency*
- *Two pantographs rough; two others finish machine*
- *Motors, controls, air valves are electrically interlocked*
- *Machines available with 2, 4, 6 or more pantograph assemblies*

Power-driven masters with infinitely variable speeds and reverse drive are easily removed and replaced by others for different job requirements. Reversing feature permits both conventional and climb milling.

All motors, controls and air valves are electrically interlocked. Each pan-



Closeup of the fuse showing one completed part and one ready to be machined.

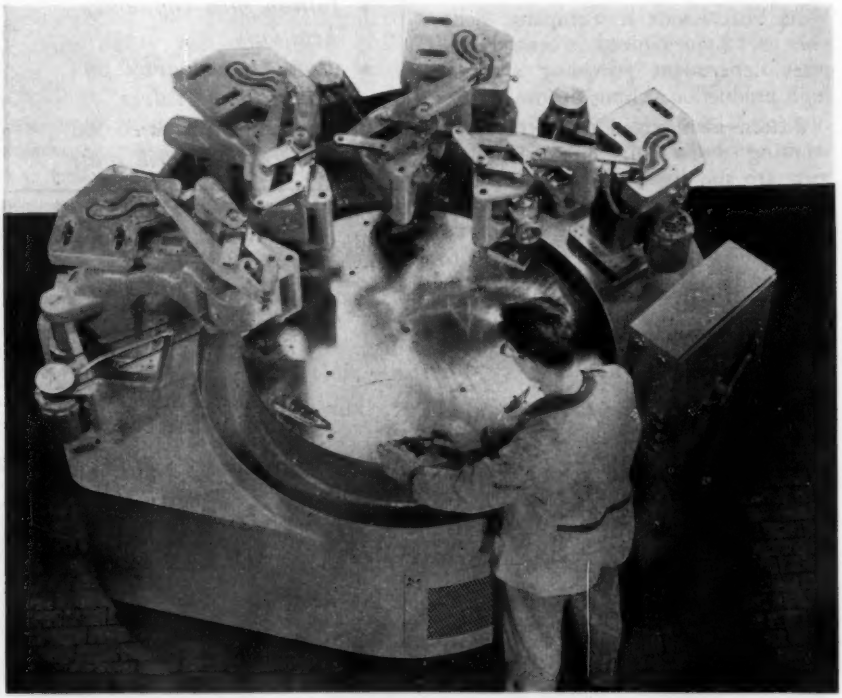
tograph is a complete, self-contained unit.

Multiple spindle indexing pantographs will engrave, mill, profile, chamfer, drill, counterbore, groove or rout piece parts on a high production basis with exceptional repetitive accuracy.

Various combinations of operations are possible including a different one performed by each pantograph. Machines available with 2, 4, 6 or more pantograph assemblies depending upon requirements. Machines are made by George Gorton Machine Co., Racine, Wis.

The End

View of the four-spindle indexing pantograph.



Drill Press Department Provides High Production Volume

- *Almost 100 drill presses handle wide range of work*
- *Fifteen men constantly kept busy*
- *Production doubled on drilling flood valves*
- *Production increased 500 per cent with drill units*

WALTER Kidde & Company, Belleville, N. J., organized a central drill press department providing accurate, high production volume at low cost.

Fifteen men are in this department working under one foreman. These men are sub-divided into three working teams, each with a setup man. When work requiring the use of the drill press department is scheduled by production control, it is up to the team setup man assigned the work to prepare the presses for production. Once inspection approval has been obtained, work is then started. It is also the setup man's responsibility to break down tooling setups once a job is completed.

No time is lost due to waiting for press facilities since ample spindles are available. All fifteen men work eight hours.

Production operation of the drill presses covers a wide variation of drilling, tapping and reaming procedures. And, facilities in the department permit the machining of parts requiring one to twelve holes, depending on engineering specifications.

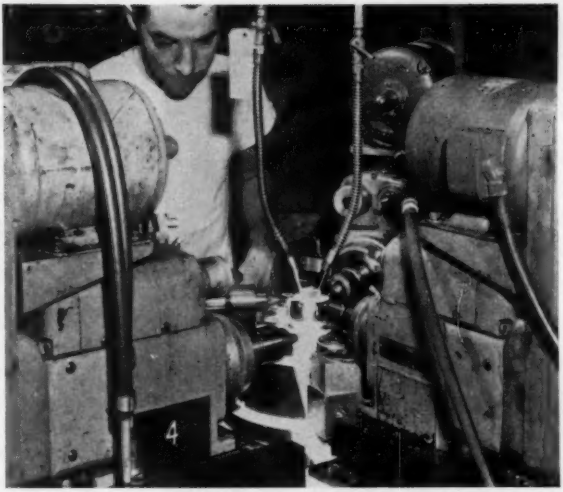
Also responsible for volume production is a working incentive plan originated by the company for drill press operators and enabling them to receive a bonus predicated on the amount and accuracy of the parts produced.

Typical Operation

A typical example: machining one-inch flood valves.

For this job five 17-inch Delta drill presses, one pneumatically controlled, are operated by one man to drill six holes. Machining cycle is as follows:

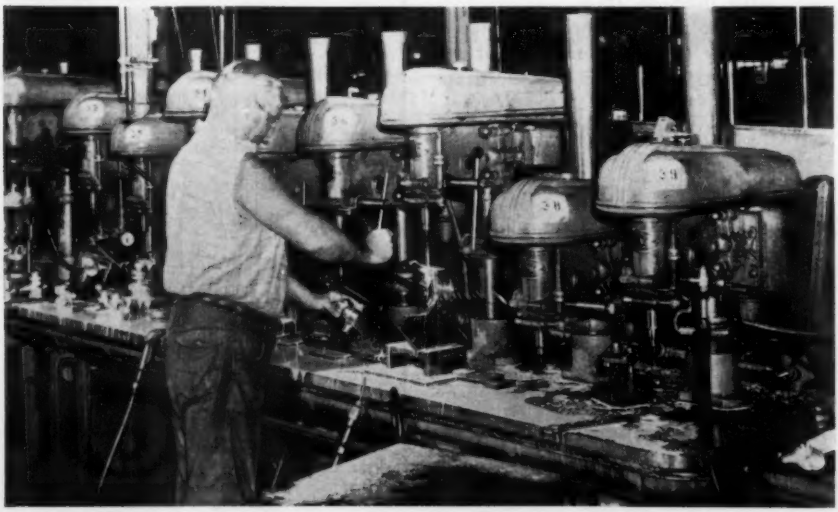
1. Drill a No. 093 hole.

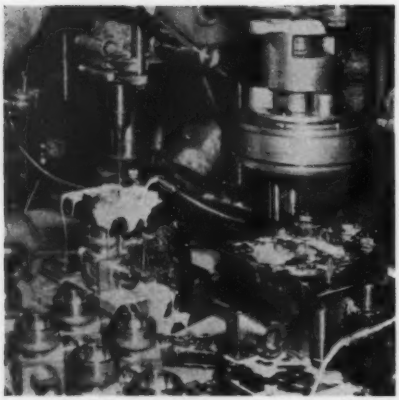


Four Rockwell air-hydraulic drill units, designed into one unitized machine tool, is machining textile compensator parts at the rate of 175 pieces an hour. The company estimates that production has increased some 500 per cent since this machine was installed.

2. Then the part is placed in a pump jig under the pneumatic drill which slowly drills the next hole to a depth of 2½ inches.
3. Next, the valve is placed in another pump jig under a multiple

Operator at Walter Kidde & Co., Belleville, N. J., using one of five 17-inch Delta drill presses to machine six holes of close tolerance in a flood valve. When machining cycle is in motion, operator maintains an hourly production rate of 25 pieces.





A pneumatically-controlled 17-inch drill press, one of five used by Walter Kidde & Co., Belleville, N. J., to machine flood valves is slowly drilling a hole of close tolerance to a depth of 2½ inches.

spindle head drill press to receive two holes simultaneously.

4. The next machine drills the fifth hole.
5. The last operation is drilling the sixth hole, ½ inch.

All of the holes are to close tolerances; many of them are angular requiring precise location and accurate drilling.

Once the operator has this work cycle in motion, he is able to maintain an hourly production rate of twenty-five pieces an hour, more than double that of what it had been previously.

The company has developed a series of clamps under spindle jigs enabling the drill press operators to perform many operations at an extremely high rate of production with accuracy and an absolute minimum of tool breakage.

Drill Units Boost Production

To supplement the operations in the drill press department, Walter Kidde & Company designed and installed eight Rockwell air-hydraulic drill units into two unitized machine tools.

Prior to the two unitized machine tools incorporating the drill units, the company had to rely on production tools that drilled one hole at a time in textile compensator parts. This form of operation permitted thirty-five pieces an hour.

Since the two unitized machine tools have been in production, the company reports an output of 175 pieces an hour, a 500 per cent increase.

The design of the two machines calls for the mounting of four drill units on a radial base. The spindles of each drill unit point horizontally to the hub of the base, where a special jig was designed to hold the part in position to receive required holes. Once the part is placed in the jig it is pneumatically locked in position. The drill units can be adjusted for vertical work as well as lateral.

The End

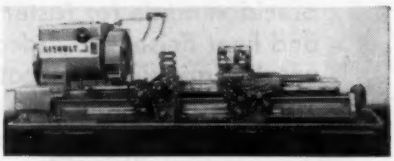
"We haven't had time to uncrate the new transfer machine so we built a door in it."

"Here's why GISHOLT insists upon the HEAVIEST CASTINGS!"

Look at them . . . castings for the heaviest saddle type turret lathes in the business! Look at all the angles:

First, note how the headstock is cast integrally with the bed for perfect spindle alignment . . . how cross supports give the most solid base for carriages, tools and slides . . . how extra-heavy webbing gives the headstock the ruggedness to support powerful gear train members.

Remember, too, that cast iron absorbs vibration. The heavier the better! And Gisholt controls the quality of the finest nickel semi-steel in its own foundry.



The Gisholt 5L Saddle Type Turret Lathe has a net weight of 22,500 lb. without equipment.

What does it mean to you? You can load up your Gisholts with carbides and really turn out the chips! You've got the strength, the rigidity and the freedom from vibration to take all the speed you can get from today's carbides—with the heaviest feeds—and still have the safety margin to take care of tomorrow's tool bit developments.

GISHOLT MACHINE COMPANY
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THE GISHOLT ROUND TABLE
represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

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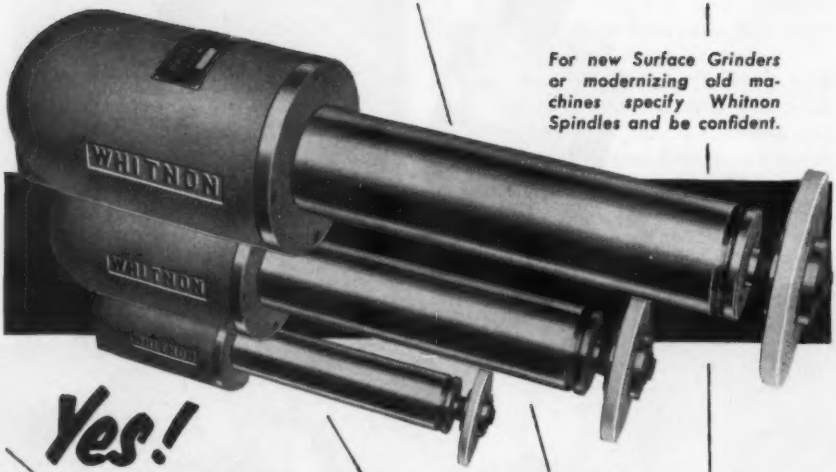

For new Surface Grinders or modernizing old machines specify Whitnon Spindles and be confident.

Yes!

THOUSANDS OF MACHINISTS IN ALL SIZE PLANTS PREFER PRECISION HIGH PRODUCTION

Whitnon SPINDLES

Whitnon Surface Grinder Spindles are precision made for faster stock removal and finer finishes . . . Ideal for the most unusual grinding applications. Whitnon Spindles are dynamically balanced as a complete assembly—skillfully lubricated to guarantee long life under most adverse conditions. Heavy spring preloading prevents all endwise motion or deflection of the rugged alloy shaft.

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The Whitnon Manufacturing Co.
217 High Street New Britain, Conn.

Shop HINTS

Cutting Tools Save Money With Tight Micro Finish

By **Harold D. Rhodenbaugh**

- *turning operation solved by carbide tools*
- *No. 10 micro-finishes easily produced*
- *solid carbide holds No. 32 micro finish for 16 hours*

Cutting tools producing tight micro-finish surfaces can save in labor costs and provide exact delivery dates.

With the various grades of carbide cutting tools available, plus modern precision machines, with versatile speeds and feeds, it is not too difficult to produce No. 10 micro-finishes.

The following paragraphs detail the writer's approach to and solution of machining to close tolerance and tight micro-finishes.

A midwest manufacturer of aircraft instruments was having difficulty with a turning operation. The part was a "Carrier". (See figure 1.) The material was 4140 steel, spec. MIL-S-5626. The operation was turning the O.D. of 2-3 and 4 pins on each part and facing surfaces A. The diameter of the pins was .2485-2495. The length of the turn was .155-.158. The amount of stock to be removed was .027.

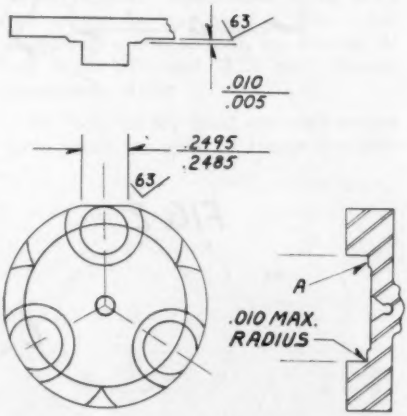


FIG. 1

This job was being done on a new, electronically controlled, custom-built machine of borematicdesign. The part was held in a collet located in a Hardinge indexing head.

The tool being used (see figure 2) was designed to complete the turning and facing operation in one pass.

When the writer was called in, the two grades of carboloy selected to do the job had failed to produce results. The first grade tried was the recommended general purpose grade for steel, 78B. Tool breakdown occurred after several parts had been machined. When carboloy, grade 78, was tried, the carboloy chipped and broke down on the first or second part.

The tool geometry, clearances, angles and rake were in accordance with sound machining practices. The machine was in excellent condition, it was level and rigid. The quill and collet were well designed and suitable. The problem then was to select a tool that would stand up to production requirements;

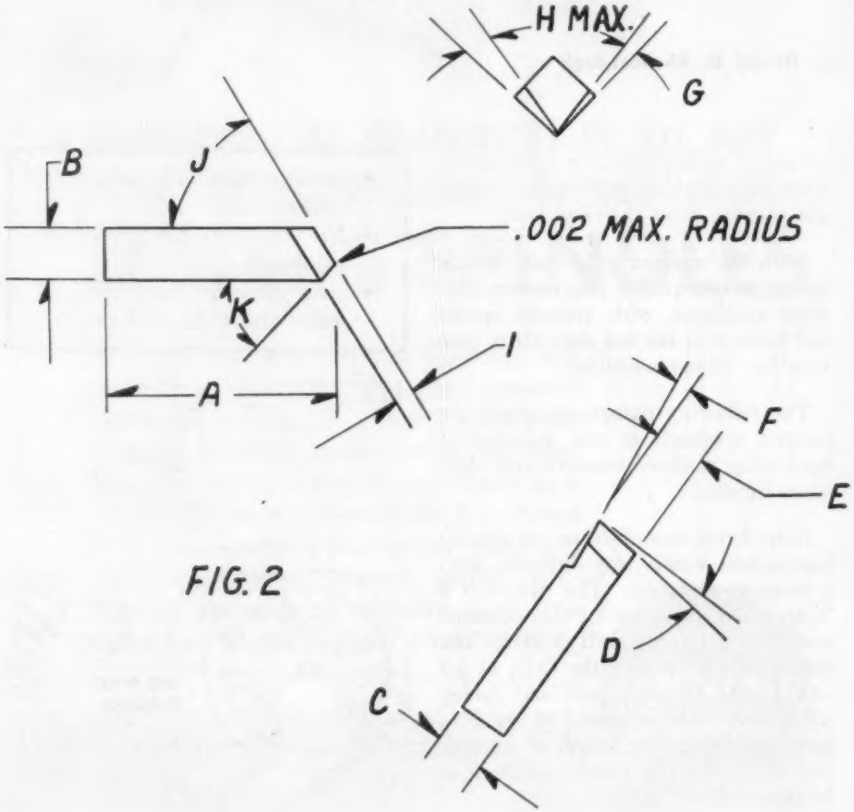


FIG. 2

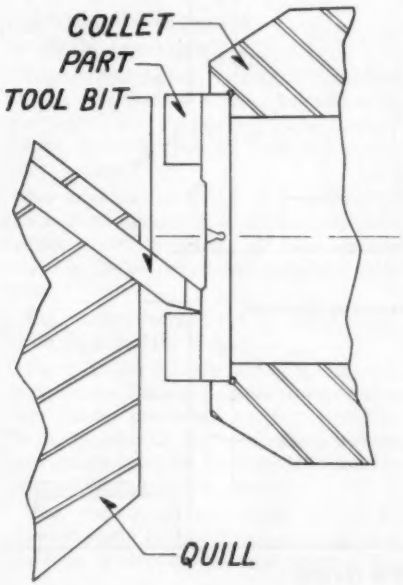
a tool that would turn and face a No. 32 micro-finish consistently with a tool point radius of .000 to .010. (Note radius on face A in figure 1).

A study of the Tool Development Print, figure 2, indicates our line of reasoning. In view of the chipping away of the carbide on the facing edge of the tool and because of the short length of the turn, trying a HSS tool-bit seemed reasonable. However, almost immediate metal breakdown occurred on the cutting point of the tool. Finish deteriorated after the first part was machined.

Next we tried a HSS tool-bit which had been put through two deep freeze cycles to a —120° below zero. This deep freeze treatment of high speed steel tools transforms any remaining Austenite within the steel to Martinsite. Even though this doubled the tool life per grind, we were not satisfied.

We reverted back to grade 883 carboloy. It is interesting to note that even though grade 883 is recommended for non-ferrous metals by the manufacturers of carbides, more often than not, grade 883 will produce more satisfactory results on 4130, 4140 and 8620 steels than the recommended steel grades 78B and 78. In this instance, grade 883 produced the desired finish consistently. However, its resistance to wear was not high enough. Too much time was lost in re-setting the tool to compensate for diameter size loss through tool wear.

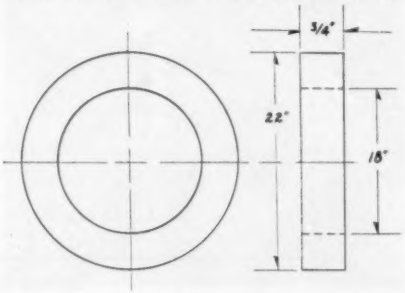
Our next selection of carboloy was grade 905 solid carbide for wear resistance, and shock. We found in this tool the answer to our problem. It will produce consistently holding a No. 32 micro-finish for twelve to sixteen hours with a minimum of time loss in tool adjustment.



Machining Rings on Miller

We were required to machine some forged rings 22" in diameter by 18" bore and as we did not have a lathe large enough or a boring mill, we decided to mill both I.D. and O.D. on a heavy Bridgeport miller.

We have an 18" hand operated rotary table which we used. To rotate the table



we turned a crown for a belt on the hand disk and for power source we moved a small B. and S. milling machine in line with the rotary table drive and made a pulley to go onto the cutter arbor and belted this up and milled the outside and bore without difficulty.

We bolted the rings from the inside to machine the O.D. then before removing the straps we bolted from the O.D. to mill the bores insuring concentricity of the rings.

While a cut was taken the operator did other work as it took about twenty five minutes to machine around the pieces.

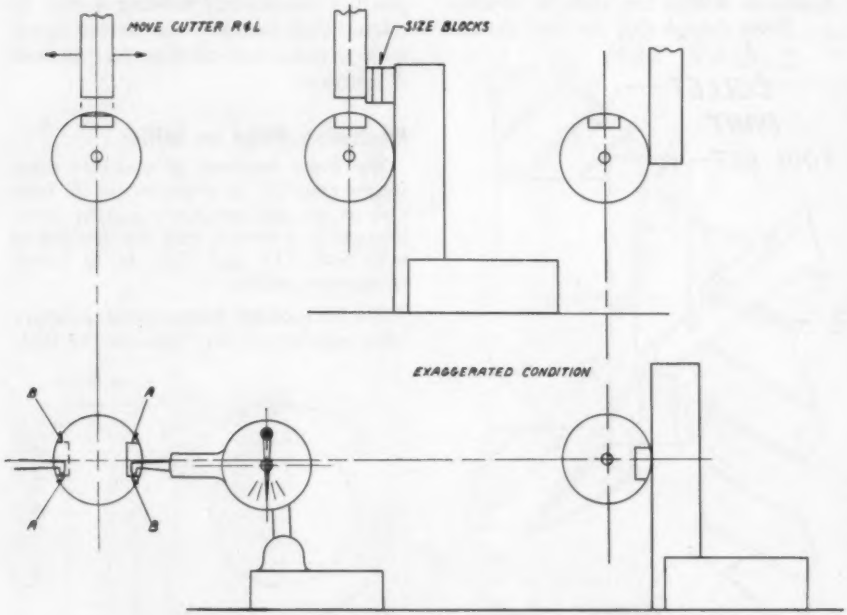
Setting cutters central

To set milling cutters for cutting keyways in shafts and for gear cutting, three methods are shown together with methods of checking.

Setting the cutter using the first method consists of milling a spot to the exact width of the cutter face by passing the cutter across the shaft or gear blank. The cutter is set central by using a magnifying glass to bring the cutter face central with the spot so milled.

Number two consists of placing a try square blade in contact with the side of the shaft as shown and gauging with size blocks between the side of cutter and square blade gauging from both sides.

For number three, have cutter make contact with side of shaft, then set cutter by cross slide using the dial on the screw of the miller table. To do this deduct the width of cutter from diameter of shaft or gear blank, divide result by two and add the width of the cutter. To set gear cutter central proceed just as for keyway but gauging from the flats



SETTING CUTTERS CENTRAL

of cutter sides or use the number one spot method.

To check cutter location of keyway, after milling, turn shaft end for end on centers without a dog and enter cutter in slot without changing cutter position and enter cutter in slot, if slot is central the cutter will enter to the bottom without scoring the sides of the cut. In the case of a gear slot, cutter contour should shut out light.

Another method is to index thru 90 degrees, setting dial indicator as shown, in lower side of slot to read zero then indexing thru 180 degrees and check the other lower side of slot with the indicator and note discrepancy if any.

Gear cutters shapes are generally central with their sides but if one is found out of center the high side should be ground to bring it central.

Care should be taken that cutters run true without side wobble due to bent arbors, otherwise slots will nct come central.

Lightening holes routed in single operation

Lightening holes in router template blocks are routed within tolerance in one operation by means of a unique router guide in use at Temco Aircraft Corporation.

No sanding or filing is required to reach final accuracy, and the only reference mark needed by the router guide is the conventional template pilot hole.

Fly cutters formerly were used to cut holes in template blocks.

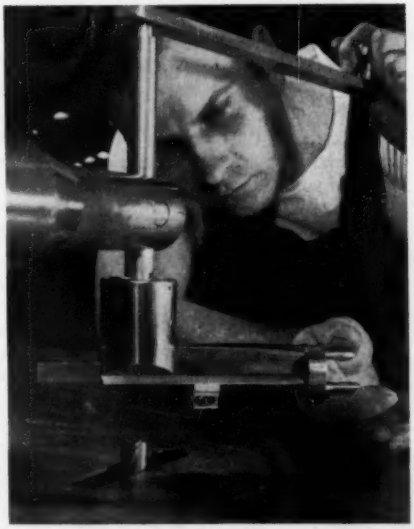
Form Block Maker John R. Pannell designed and developed the router guide that made precision cutting possible. He designed it to fit an improved screw-type guide head he built in 1952 for his Onsrud tilting arbor router.

The router guide's most unusual characteristic is that it rotates the form block in a circular pattern around the stationary router blade to make the lightening hole. Normally, of course, the fly-cutter moves and the form block remains stationary.

This reversal of customary procedure gives the new router guide its impressive accuracy, according to Designer Pannell. Measurements taken from the stationary router blade to a tapered point which rests in the template's pilot hole are much more accurate than those possible with a fly-cutter.

Basically, Pannell's attachment consists of these key members: a 9-inch vertical shaft which is held by the screw-type guide head; a 13-inch-long crank attached horizontally to the top of the shaft, and a 6-inch track attached horizontally to the bottom of the vertical shaft.

The tapered point travels along this track by means of a screw traverse. A 6-inch scale on one side of the track is graduated in tenths-of-an-inch. A circular scale at one end of the track is graduated in thousandths-of-an-inch. Indicators on both of these scales move



along with the tapered point when Pannell revolves two handles that actuate the screw traverse.

To setup for routing a hole with a two-inch radius, Pannell first lines up his tapered point with the two-inch marker on the six-inch scale. This means the point is precisely two inches from the back side of the router blade.

If the radius required were .003 more than 2 inches, Pannell would make the 2-inch adjustment on the large scale, then use the circular scale to add in the thousandths.

Once the tapered point is properly positioned, it is lowered into the pilot hole of the template to be routed, where it automatically centers.

Pannell then turns the crank, attached to the top of the vertical shaft. One counter-clockwise revolution of the crank revolves the template in a perfect circle over the router blade. The cut is so exact that no sanding is necessary.

Pannell's attachment is saving Temco an average of 15 minutes per form block. It is designed to rout holes up to 8¼ inches in diameter.

Standard straight form tool

By **Harold D. Rhodenbaugh**

The cost of the straight plunge form tool pertinent to bar stock operations on hand screw machines can be reduced by a sizable figure if some thought is given to its peculiar yet universal application.

Practical plunge form application is not confined to forming diameters behind flanges or larger diameters that will not admit hexigon turret turning tools.

Where diameters are of a length permissable to plunge forming and where the amount of stock to be removed would require more than one turning cut, a plunge form cut from the square turret or rear tool post, in many cases, would have to be considered from a production stand point.

To apply special tool numbers to this type of tool thereby relegating them to special purpose tools is an extravagance enjoyed by only the larger corporations.

To permit the operator or job setter to make up these tools as required is adding unnecessary cost to the plunge form tool.

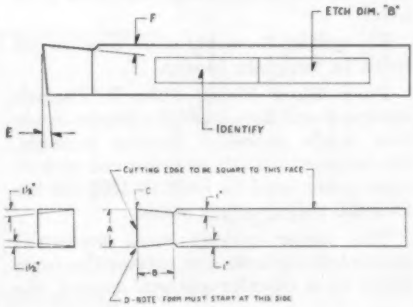
Figure 1 shows a method of making and controling all straight plunge form tools for a screw machine department.

It may be noted in Figure 1 that the A, C, D dimensions are critical. All other dimensions may be termed as not critical. Therefore, all straight plunge form tools may be made and controlled from one sketch or tabulated print.

The savings in tool design as compared against a T-number tool which requires a design for each tool will attract the interest of a prudent engineer.

Furthermore, by standardizing the straight plunge form tool the quantity of tools to meet the manufacturing requirements will be greatly reduced.

Consider now the flexible application of the straight plunge form tool. Using number WS-6070 in Figure 1 a .500 width plunge form can be made. The same tool will produce a diameter to any desired width under .500 when forming on the end of a bar. It will produce



IEW

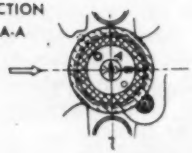
NORGREN MICRO-FOG LUBRICATORS FOR AIR TOOLS AND CYLINDERS

variable vane feature provides greater flexibility

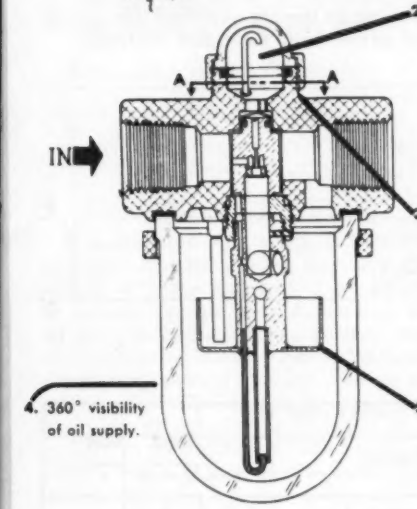
- *meet a broader range of operating conditions*
- *each can handle jobs now done by several sizes of lubricators*

distinctive Norgren features

SECTION A-A



1. VARIABLE VANE VENTURI
View showing Index Marks "A" and "B" for Position of Rotatable Vane Type Venturi Plug.


2. 360° visibility of the oil feed
A
A
IN
3. Oil feed controlled by auxiliary air circuit... gives an accurate and uniform rate of oil feed.
4. 360° visibility of oil supply.
5. Constant oil level... rate of oil feed not affected by oil supply.

6. Ability to produce a very fine oil fog and deliver it over long distances, through complex piping systems, and obtain equal distribution to multiple lubrication points.

A simple adjustment inside the dome provides a wide range of air flow for varying conditions or different applications. For example, at 80 psi the ⅜" size can be set for a flow range of 5 to 9 cfm, a high range of 50 to 100 cfm, or any intermediate range desired.

The new line includes 20 models.

Flow Capacities:
¼", 5 to 40 cfm
⅜" & ½", 5 to 100 cfm
¾" & 1", 5 to 250 cfm

Oil Capacities:
Transparent bowl, ½ pt.
Tank Type, 1¾ gal. and 4½ gal.

FOR DETAILS WRITE FOR FORM 496

C. A. Norgren CO.
3438 So. Elati, Englewood, Colo.

Oil Fog Lubricators • Pressure Regulators • Air Filters • Valves • Hose Assemblies

a plunge form on the cutoff end of the bar to any width within .500 minus the width of the parting or cutoff tool.

To standardize the straight plunge form tool is as simple as the sketch in figure 1. Designate the tool bit from which the form tool is to be made. Select any block of numbers, adding one (1) each time a new tool is made. Dimension as shown.

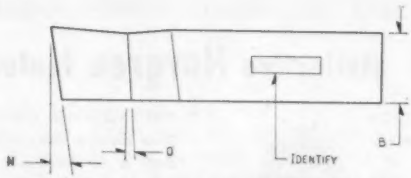
As the tools are ground down to undersize per print, they may be ground down to the high limit of a lower A dimension and re-identified per number.

Figure 1 showing the variations on the A dimension indicates that control of these existing form tools was captured in the shop. Later they will be dimensioned numerically and the standardization will be uniform.

Combination cutoff & chamfer tool

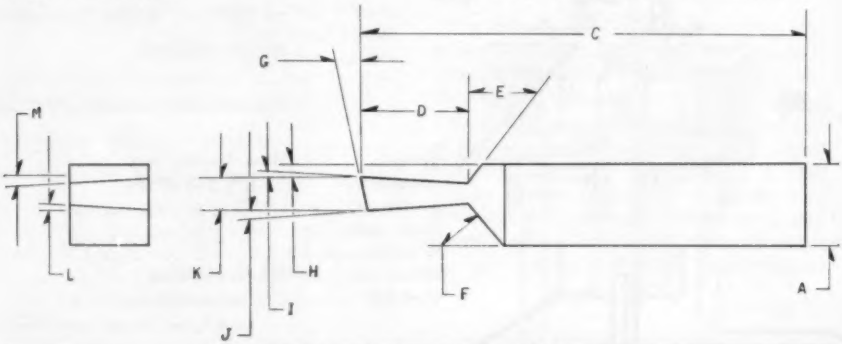
Figure (1) shows a standard combination cutoff and chamfer tool. This tool, simple in design, made from a H.S.S. tool blank, is particularly adaptable to bar stock work on handscrew machines.

By incorporating the chamfer on the cutoff tool a chamfer or angle can be established on the end of the next part to be produced by simple advancing the cutoff tool, thus bringing the chamfer edge to its work.



This tool is especially desirable where a chamfer breakdown is necessary for starting a box or roller turner.

As can be readily observed this simple tool saves both time and material.



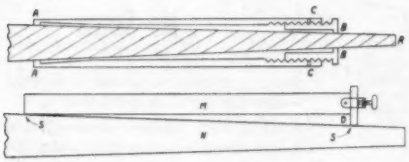
HIGH SPEED STEEL COMBINATION CHAMFER & CUTOFF TOOL																
STANDARD PURCHASED TOOL-BIT				GRINDING DATA STANDARDIZED											DATE 12.11.52	ISSUE - A
H.S.S. REX AAA OR EQUIV.	A	B	C	WS-NUMBER	D	E	F	G	H	I	J	K	L	M	N	O
"	5/8	5/8	4½	WS 5070	½"	45°	45°	5°	1/8"	1½°	1½°	1/8"	1°	1°	5°	5°
"	3/4	3/4	5	WS 5071	3/4"	45°	45°	5°		1°	1°	3/16"	1°	1°	5°	5°

Gauge for checking spiral taper propeller reamers

By Harold (Hi) Johnson

The initial step is to grind an accurate taper on a long arbor that covers all reamer sizes. Then, make up adjustable double end ring gauges about 1" shorter than the length of each reamer size with the small end of reamer, then place the gauge on the standard arbor and adjust gauge length so that both ends fit tight on the arbor. Next, try the gauge on the reamer and it should fit tight at both ends. Now it is possible to ream out the ends of the gauge to a good taper. Try the gauge on the master arbor again, if it fits both ends of the master, the reamer taper is all right.

The gauges shown in the sketch were made of pipe or tubing. The difference in size was enough to allow one gauge to slide inside the next size gauge.



B is one ring size which is threaded into part A, with the big size ring and locked with the lock nut C, which can be threaded as one piece A, and then cut off after threading. R is a reamer with OD number of blades. For an accurate check, use spotting blue on arbor to set gauge, then wipe out gauge rings and blue the reamer. You can tell if it doesn't fit by feeling it with thickness paper over a blade at the loose end, which will also tell you how much to change the taper setting on the grinder.

Use a Steel rule with a sliding height rule on one end to scribe miking points on arbor when you don't want to cut any grooves. With scribing blue on the arbor N around the points S and S and the steel rule M is one foot long, and if the taper is ¾" per ft., then the space D would be ⅜" and the difference in size at the scribe marks at S and S should mike .750.

Keyway cutter tabulation

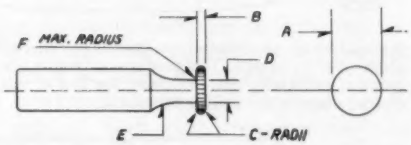
By Harold D. Rhodenbaugh

There is an ever increasing need for positive identification of tooling so often referred to as "standard".

For example, see the simple tool known as the keyway cutter. It can be purchased in standard width sized through the decimal equivalent table. However, because these tools may be purchased as standard items there is a general tendency to overlook their relationship to tight tolerances and consequently considerable time may be lost after parts have been released to production.

Example: a blue print may call for an .093 wide keyway with a plus/minus .002 on the width and a plus/minus .005 on a .250 radius. A standard 3/32" x ½" dia. keyway cutter will not necessarily produce these dimensions without alteration.

The charting of these altered keyway cutters will save time and money. See Figure No. 1.

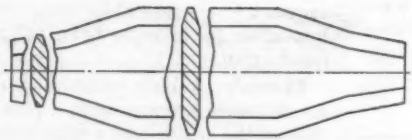


T-NUMBER	A	B	C	D	E	F
T-10930-01	1/2"	.062 +.004	.046 +.002	——	——	——
T-10930-02	.950 +.0002	.0397 +.001	.000	.063 +.001	5/8" MIN	.010
T-10930-03	1/4"	.0655 +.004	.031 +.004	——	——	——
T-10930-04	3/8"	.062	.031	.063 +.001	5/8" MIN	.010
T-10930-05	3/32"/.250	.0625/.0618	.000	.063 +.003	5/8" MIN	.010
T-10930-06	5/16	.0618 - .0615	.000	——	——	——
T-10930-07	1/8"	.093 +.0001	.000	——	——	——

BT-33315	1/2"	.095 +.0005 -.0006	.000	——	——	——
BT-32486	1"	.065	.000	——	——	——
BT-32151		.0655 +.0005 -.0002	.000	——	——	——
BT-30119	5/8"	.1075 +.001 -.001	.000	——	——	——
T-32749	1/4"	.0625 - .0615	.005 MAX	.075 - .070	——	——

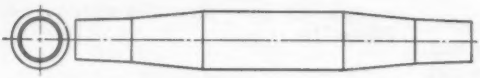
Swaging Success Stories

Swaging prior to forging . . . saves materials, machining, trimming

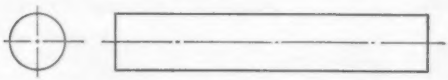


This precision-forged piece under normal procedures would have required extensive trimming and machining operations.

But Torrington's swaging experts suggested a method that saved time and material—cut finishing operations to a minimum.



A round blank was swaged to a predetermined double taper shape prior to forging. This produced a forging blank of the required uniformity that facilitated the flow of metal to the desired shape in the forging operation.



And, since the new blank was smaller than the one used before swaging, expensive material was saved.

Swaging Advantages . . . No Chips . . . No Waste . . . No Scrap

Swaging reduces metal—saves material—does not cut it away wastefully.

Swaging work hardens metal—gives it added strength, better finish and resiliency, dimensional accuracy.

Swaging is fast—can be done by unskilled workers to produce more pieces at lower cost.

Write for our informative booklet on swaging that gives detailed descriptions of Torrington Rotary Swagers. It may show you how to achieve new savings in your own plant.

THE TORRINGTON COMPANY
Swager Department
580 North Street, Torrington, Conn.
Makers of Torrington Needle Bearings

TORRINGTON ROTARY SWAGING MACHINES

Modern Tools in Action

Unique Fixture Doubles Output On 2-Station Broaching Machine

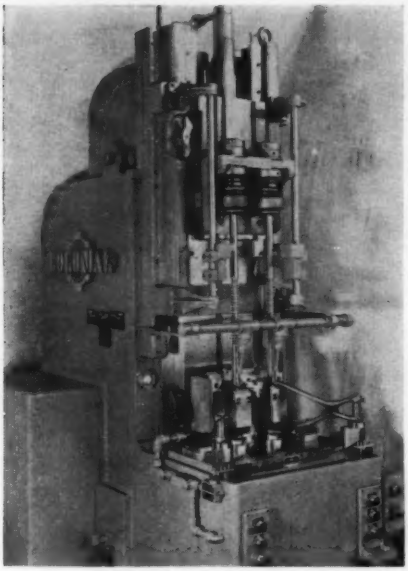
Two pull-down broaching tools have been adapted to a single standard broaching machine with a single clamping and locating fixture for the purpose of broaching two parts at a time. The RD-6-42 machine with a 6-ton, 42-inch stroke capacity and the tools and fixture combination are the products of the Colonial Broach Company, P. O. Box 37, Harper Station, Detroit 13, Mich.

The operation involves broaching of two internal serrations in each of two automobile suspension upper knuckle-supports during one down-stroke of the machine's ram. Both sets of internal serrations are broached on the same center line in a straight through pass. A complicating factor was the location of the two internal holes being broached —they were at the extremities of the x-shaped knuckle-support arms and led to deflection and permanent distortion problems.

THIS FIXTURE WILL . . .

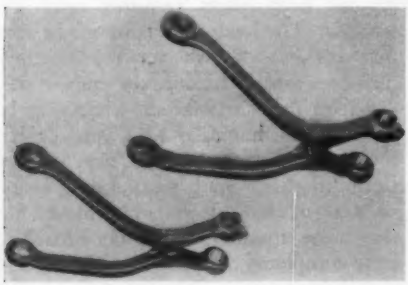
- *provide 300 parts per hour*
- *broach two parts simultaneously*
- *take only 15 seconds for loading and unloading*

A simple clamping and guiding fixture was designed that allowed over 300 parts per hour to be broached at 100 percent efficiency. Loading and unloading of both parts requires only 15 seconds. The loading portion of the fixture consists of two vertical locating pins over which the opposite ends of the x-shaped part are placed. Clamping is achieved mechanically as a cam on the main ram slide engages an arm on the fixture that is linked to expanding jacks or wedges. Unclamping is achieved in the same manner after the broaches have completed their stroke. The wedg-



ing action of the fixture rigidly supports the two cantilevered arms, thereby resisting the high broaching loads as the tool passes through the holes.

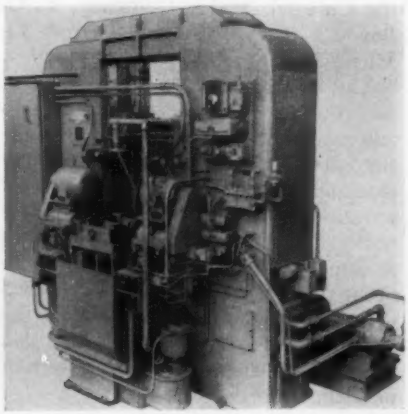
Fixture and machine controls are electrically interlocked for safety. Complete knuckle-supports are removed with the broaching tools in the downward position. The tools then return at the rate of 60 ft. per minute and the operator places two more parts in the fixture. Cutting stroke is at the rate of 30 ft. per minute.



Broaching & Centering Machine

This broach made by American Broach & Machine Co., broaches and then center drills the ends of automotive main transmission shaft forgings, two at a time.

Two standard vertical hydraulic broaching machines, each of 10 ton work capacity and with a broaching stroke of 36" were adapted to a common center base. The vertical columns of the machines were joined at the base and top to form a rigid integral unit. Mounted on the table is a hydraulically operated lateral slide, which moves the fixture and locks it at the broaching and centering station. The two station fixture holds two parts which are hydraulically clamped. Adjustable centering jaws which clamp the parts, compensate for eccentric wear conditions. Four drilling units are mounted two on each side, for the centering operation. A hydraulic feed is used to move the units in and out of position at the centering station. Separate electric motors rotate the drills for the centering operation.



The operator loads two parts in the fixture and pushes electrical control button to start cycle. The parts are automatically clamped and move into broaching position. Surface broach sections approximately 30" long move down, broaching approximately a ¼" of stock from each end of the forged parts. The slide then moves back to the centering station, where four center drills simultaneously move in to center drill the ends of the two parts. The parts then unclamp and the operator unloads, completing one cycle. The machine cycle is about 11 seconds, which gives an approximate production of over 300 parts per hour.

High Speed circular saw cuts 43" aluminum billets

The heavy press program of producing large aircraft components requires accurate, fast production of cut-off aluminum stock. To meet this need, The Motch & Merryweather Machinery Company has designed and built the Model No. 5 High Speed Circular Sawing Machine with capacity for cutting 43" diameter aluminum billets.

The machine features a steel gear case housing a heavy duty, helical gear train mounted on pre-loaded roller bearings. The saw head ways have non-metallic wear strips and forced feed lubrication. Variable saw feed is by hydraulic cylinder. The drive of the gear case is through multiple vee-belts and pulleys by 150 horsepower, D.C., totally enclosed motor, operated by an A.C.-D.C. motor generator set, giving variable speeds within an 8:1 ratio.

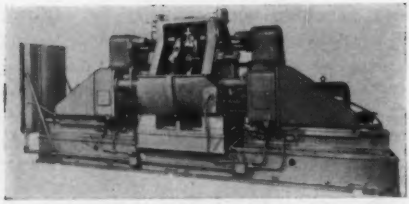
Two-part Machining Gives Double Output

The problem of machining two different parts at high production rates on the same machine was solved by The Morris Machine Tool Company of Cincinnati, Ohio. The parts involved were two types of flange yokes for universal joints.

The dual-part versatility for a "special purpose" machine was solved by providing quickly changed fixtures which properly position each part for machining. The fixtures are equipped with hydraulic clamping and unclamping to give the secure, heavy duty work holding required by the nature of the operations.

Further complicating the job was the operation performed. The flange yokes were steel forgings and two bosses had to be drilled to a finished diameter of 1.535-1.530". The amount of metal removed was considerable; chip disposal had to be considered. The power required to feed the drills was a significant factor.

The Mor-Speed machine had a number of interesting features. The two-way horizontal type machine had an automatically indexing "trunnion" carrying the parts between two opposed horizontal heads. The setup is such that the drilling pressure of one head on one side of the part is effectively counter-



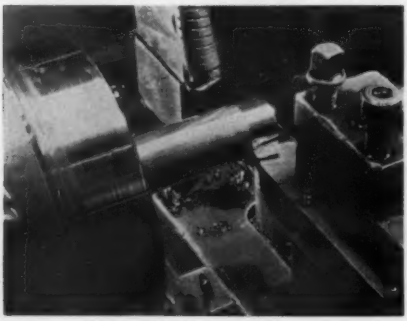
acted by the pressure from the other head.

That the drilling pressure is considerable is indicated by the fact that the fixtures are double loaded to obtain 158 pieces per hour; this involves feeding two 1" drills and two 1 7/16" core drills simultaneously. Such drilling produces quantities of chips. With the Mor-Speed design, the chips fall into the base of the machine and are washed into a chip basket.

Separate hydraulic feeds are provided for each of the horizontal heads. Thus, each head acts independently, feeding at a constant rate regardless of the condition of the tool. In addition to drilling and chamfering the machine rough and finish mills two 3½" diameters.

Square Carbide Inserts Slash Machining Costs on Stainless Steel

Direct tool cost savings of approximately $7.00 per thousand parts produced plus minimum tool changing and grinding time was recently secured at a prominent Midwestern manufacturer's plant by using indexable square carbide inserts for rough turning forged 321 stainless steel jet engine nozzles—at 1/20 of their previous tool cost.



Heretofore the operation was handled with another manufacturer's brazed carbide tools at 0.0045-inch feed, 150 surface feet per minute, and 0.093-inch depth of cut. Using these tools best life was 50 to 60 pieces per grind or a total of 640 pieces per tool. Under this setup, tool cost per piece was $0.0071 or 7-tenths of a cent.

Now, using Kennametal tungsten carbide square insert tools of style SBR-85 in grade K6, 325 to 350 pieces are turned per cutting edge at a feed of 0.003-inch per revolution. Depth of cut is 0.093-inch at 1480 revolutions per minute and 490 surface feet per minute. Lathe used in the operation is a No. 3 Warner and Swasey of 10- horsepower. With four cutting edges available on each end of the clamped insert, an average of 2700 pieces are machined between grinds. Since about 1/32-inch of stock is removed from each of the insert's ends in regrinding, estimated number of pieces per insert is 32,400.

To turn 32,400 pieces with a brazed tool would have cost $0.0007 per piece produced.

Surface Grinding Machine Prefinishes Steel Blanks

The Curtis Machine Corporation of Jamestown, New York has completed a giant surface grinding machine to be

END MILL SPECIALISTS

and What it...
...Means to YOU...

HIGH SPEED

TWO FLUTE

THREE FLUTE

FOUR FLUTE

LONG LIFE

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3374 West 140th St., Cleveland 11, Ohio

used in the automotive industry for prefinishing steel blanks prior to forming. The 35 ton machine was recently installed in a plant of a leading automobile manufacturer where it will be used to prefinish automotive bumperettes before they are formed. The machine will substantially reduce any further finishing operations prior to plating and in eliminating manual polishing.

The four head abrasive belt surface grinder uses progressively finer grinding belts. Blanks enter the 36 foot machine on a neoprene conveyor belt. This type of conveying permits the grinding of small and large blanks. This machine will take stock up to 20 inches in width and any length. Rubber hold down rolls and powerful permanent magnets used at the point of grinding prevent slippage of blanks. The machine is built for dry operations as well as wet abrasive grinding. Adjustments of grinding heads for thicknesses of stock can be made quickly through centrally located push-button control. Conveyor speed is infinitely variable from 15 to 60 feet per minute.

2,000 Ton Clearing Press Trims Aluminum Forgings

The unusual 2,000 ton press shown here under test, was designed by Clearing Machine Corp., Division of U.S. Industries, Inc., 6499 W. 65th St., Chicago 38, Ill., to trim massive aluminum forgings. The press represents a wide departure from conventional methods of trimming forgings.

The machine is of the housing type with pre-loaded tie-rod frame construction. This type of construction best resists the effects of off-center loading—a standard condition of operation in trimming work.

A unique system for taking care of "break-through" shock is built into this press. When the slide presses through the work during the last portion of the work stroke, it also presses against a cushion cylinder. The cushion cylinder, designed to withstand full press tonnage, reduces the pressure setting by exhausting its volume through a fixed orifice. When the slide breaks through the work, the hydraulic system is decompressed gradually. The cushion restrains the movement of the slide as it attempts to accelerate and continue its stroke.

2,000 ton Clearing hydraulic press is shown during trial run at Clearing's Chicago plant. This press was designed for trimming of massive aluminum forgings.

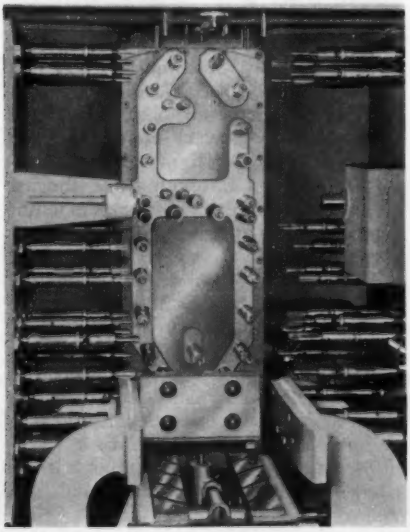
Automatic Machine taps 97 holes in one cycle

Michigan Drill Head Co., P.O. Box 4643, Detroit 34, Mich., has developed an automatic machine for tapping holes in tractor transmission cases. In one cycle, it taps a total of 97 holes, in all six sides of a transmission case. It can complete the tapping operations on 40 crank cases per hour without any down time.

From a roller conveyor, the crankcase enters the machine—the cycle switch is operated—and, the entire cycle is automatic. Locaters align the crankcase; the crankcase is clamped; the front tapping unit slides in front of the case; and, then, all tap spindles start rotating.

There are 6 tapping units—one for each side of the crankcase. The front unit has 4 spindles; the bottom unit, 10 spindles; the right hand unit, 21 spindles; the left hand unit, 22 spindles; the top unit, 8 spindles; the rear unit, 32 spindles—a total of 97 spindles. All spindles are of the individual lead screw and nut type, individually lubricated. All taps are lubricated by an independent coolant system.

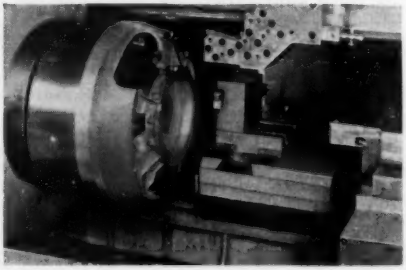
When tapping is completed, the crankcase is automatically unclamped; the locaters retract; and the front tapping unit returns to its original position—clearing the way for unloading.

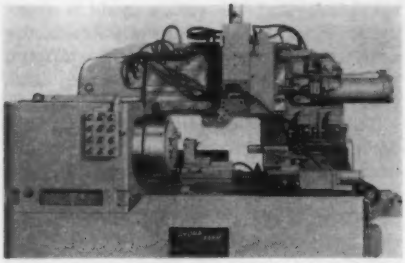


Magnesium Alloy Jet Engine Housings Roughed and Finished On Single Automatic Lathe

Maximum utilization of tooling permits a single automatic lathe to be used by a major aircraft engine builder for roughing and finishing of a cast magnesium alloy jet engine housing. The Model HD-24 lathe built by Hydra-Feed Machine Tool Corporation, Ferndale, Mich., performs all cutting opera-

Closeup of magnesium alloy jet engine housing rough and finish machined on a single Model HD-24 Hydra-Feed lathe. Multiple tools on top and rear carriages plus those on the platen still leave the front of the machine free for easy loading and unloading.





Overall view of Hydra-Feed Model HD-24 lathe used to rough and finish machine jet engine housings. The hydraulically operated special chuck shown is actuated by a single push-button.

tions automatically, requiring only push-button actuation for clamp, feed start, and unclamp.

A specially designed finger chuck is used to hold the jet engine housing for machining. Three fingers on the hydraulically operated chuck grip the workpiece firmly without obstructing the movement of the tools or distorting the piece in either roughing or finishing.

Tooling is indentical for both machining cycles with the exception of a removable chamfer tool that is used only for finishing.

After the magnesium housing is hydraulically clamped in place to start the roughing cycle, the top and rear carriages rapid advance to start their cuts. Three tools are used on the top carriage to rough bore three different diameters. A longitudinally feeding tool on the rear carriage simultaneously turns the outside diameter.

An added feature on this setup is the use of the platen which is an optional feature on Hydra-Feed lathes. As the top and rear carriage rapid return to clear the workpiece, the platen slide equipped with four tools rapid advances and faces three external surfaces plus the bottom of the main bore.

At the completion of its cut, the platen automatically retracts and the spindle stops ready for unloading. The part is unclamped with a push-button.

This single machine maintains enough production to supply the engine builder's current production requirements while performing both roughing and finishing operations. After a bank of the magnesium housings are rough machined the machine is quickly converted for finish turning and a removable chamfering tool is added to the top carriage. The finish machining cycle is identical with roughing with the addition of the chamfering tool used to break the corner on the largest bore diameter.

For machining the magnesium castings, the Model HD-24 Hydra-Feed lathe is equipped with a two-speed 1800/3600 rpm motor. Provision is made for automatic shifting of motor speeds as required by the machines cycle.

15-ton press produces 300 jet gaskets an hour

Jet engine water seal gaskets are being produced at the rate of 300 an hour on a 15-ton Flexopress by a Cincinnati small parts manufacturer. The manufacturer said he selected the Flexopress, made by Precision Welder & Flexopress, Inc., Cincinnati, O., because of its infinitely variable stroke setting to provide maximum precision life of a six-stage progressive die in dead soft material; and to eliminate the possibilities of work hardening and the use of hard copper in fixed-stroke machine requiring subsequent annealing of work piece.

The material was dead soft copper 1/16" x 1½" strip stock and the requirements of the piece were: five per jet engine; uniform precision; high pressure sealing under sustained heats and load duties. The water and steam sealing was required on two faces and in center of hole. Precision and uniformity were also required for easy assembly to avoid possible damage to the dead soft material.

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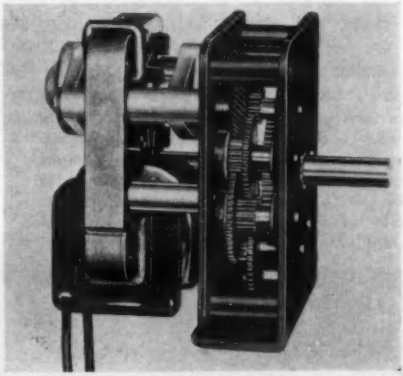
Approximate dimensions of holes in the finished part were: four small holes approximately 1/16" and center hole ½". The machine setting was 300 strokes per minute, variable.

Features of the Flexopress are: integral feed rolls, ball bearing ram ways, variable speed and feed, minimum floor space and complete accessibility of die mounting area. The presses have a speed range from 150 to 600 strokes per minute.

Gear train and motor combination

A gear train and motor combination announced by the New England Gear Works, Dept. B, 2012 South End Rd., Southington, Conn., is available in a selection of torques ranging from 60 lb. in. at 1 r.p.m. to 50 lb. in. at 10 r.p.m. and in any single speed from ¼ r.p.m. to 426 r.p.m. operating either clockwise or counter-clockwise. Gears, pinions and shafts are hardened steel, bearings are bronze and lubrication is provided by a large felt oil reservoir.



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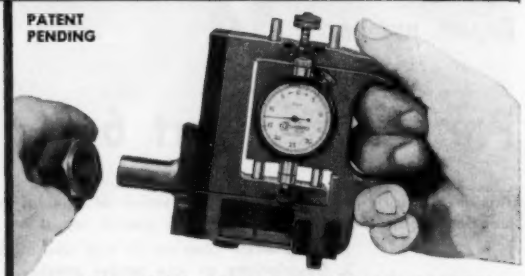
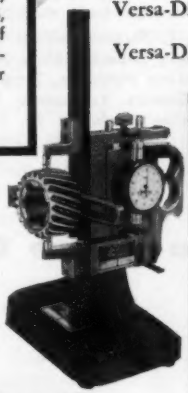
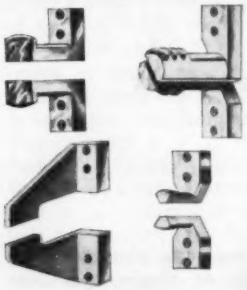


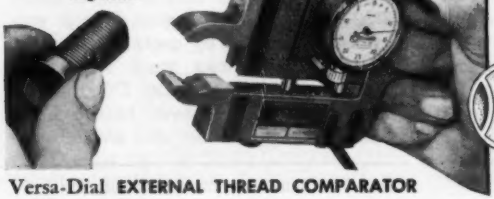
Versa-Dial **INTERNAL THREAD COMPARATOR**



Versa-Dial **HELICAL GEAR PD COMPARATOR**
mounted on bench stand



Interchangeable Segments



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A special report
by the editors of
MACHINE and TOOL
BLUE BOOK

Report number 44

Presses . . . part 6

This is the forty-fourth in a monthly series of special reports discussing various types of machine tools. Included in this month's special report on presses are:

1. Deep Draw titanium in one operation.
2. Descriptions of late model presses.
3. Specifications of American-built machines.

Previously published reports discussed: 1. Thread Rolling; 2. Power Press Brakes; 3, 4, 5. Milling Machines; 6. Honing, Lapping and Superfinishing; 7. Automatic Screw Machines; 8. MAPI Replacement Formula; 9, 10. Chucking Machines, Turret Lathes, Hand Screw Machines; 11. Broaching Machines; 12. Shapers, Slotters, Keyseaters; 13, 14, 15. Lathes; 16. Planers; 17. Gear Making Machines; 18, 19. Boring Machines; 20, 21, 22, 23, 24, 25, 26. Drilling Machines; 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38. Grinding Machines; 39, 40, 41, 42, 43. Presses.

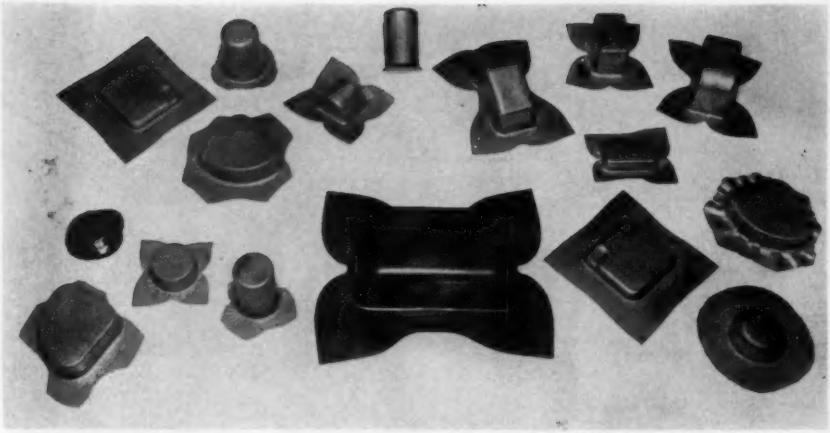
Deep Draw Titanium in One Operation

By R. G. Gillespie
Brooks & Perkins, Inc.
Detroit 16, Mich.

TITANIUM is structurally similar to magnesium. Theoretically, techniques for deep drawing and forming the two metals should be much the same. So Brooks and Perkins, being the largest fabricator of deep drawn magnesium parts, devoted months of research and development time to developing titanium forming techniques. This work has been carried out independently by Brooks and Perkins without government sponsorship.

The deep drawn parts pictured here have been made as single operation hot draws, using Rem-Cru* A-55 (RC-55), A-70 (RC-70) and C-110M (RC-130A). Until this work was done it was generally assumed by users of titanium that multiple draws were necessary, with intermediate anneals. Deep draws of this type have never before been made in one operation, and availability

*Rem-Cru Titanium, Inc., Midland, Pa.



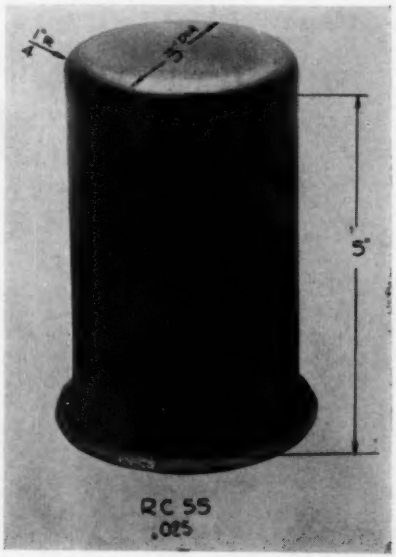
1. Deep draws made in one operation with RC-55, RC-70, and RC-130A titanium sheet.

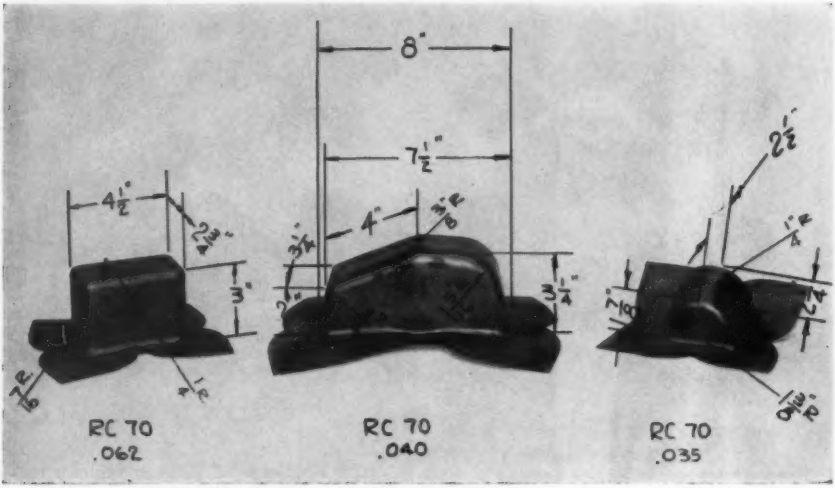
of such draws opens up new possibilities for the design and use of titanium. Costs of fabrication of many parts can be reduced by this Brooks and Perkins technique.

Shown in figure 1 are deep draws of various kinds made with Rem-Cru A-55, A-70 and C-110M. These are each made in one operation with one set of dies. Figure 2 is a cylinder hot drawn in one operation from .025" gauge A-55. The cylinder is 3" in diameter and 5" deep. The corner radius is ¼". No difficulty was encountered in this draw and it is reasonable to suppose that had the punch been longer than 5", a considerably deeper cylinder could have been drawn successfully. This is an unusually deep draw for a 3" diameter cylinder and results on this job indicate that in some cases titanium may be even easier to hot draw than magnesium.

In figure 3, various parts made of Rem-Cru A-70 in single operation draws are shown. The dimensions shown and radii of the various parts illustrate typical designs which can be made with no

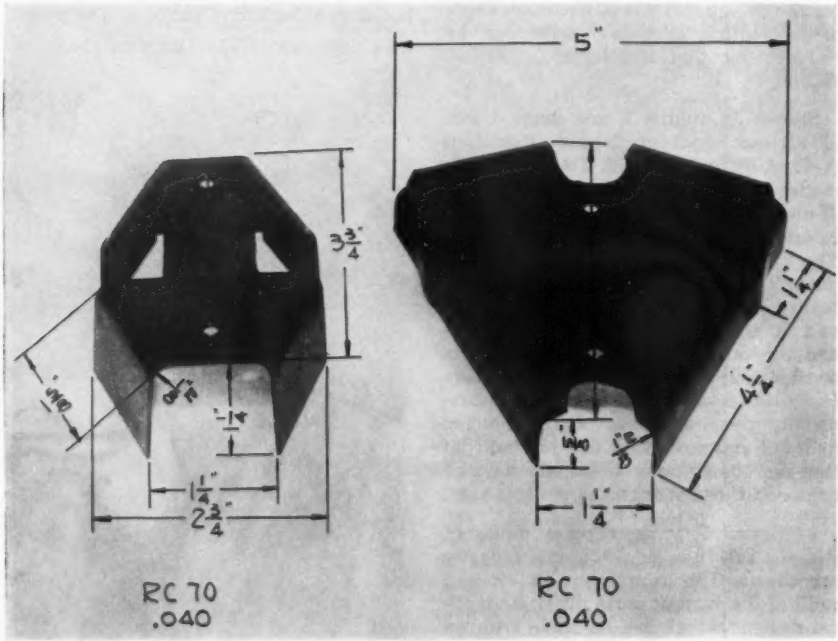
2. 3-inch diameter. 5-inch deep cylinder hot drawn, with one stroke of the press, from .025" thick RC-55 titanium sheet.





3. These three RC-70 titanium parts are made as single-operation hot draws.

4. & 5. These RC-70 titanium parts were rubber formed (Guerin process).



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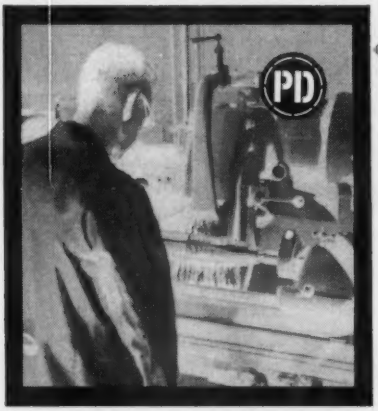

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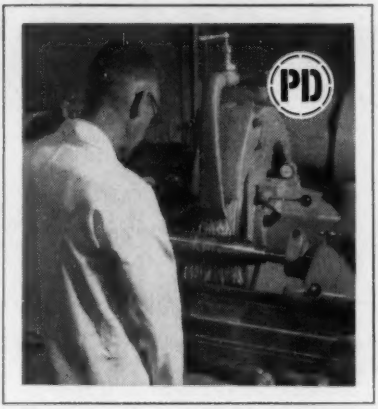

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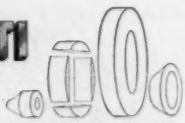

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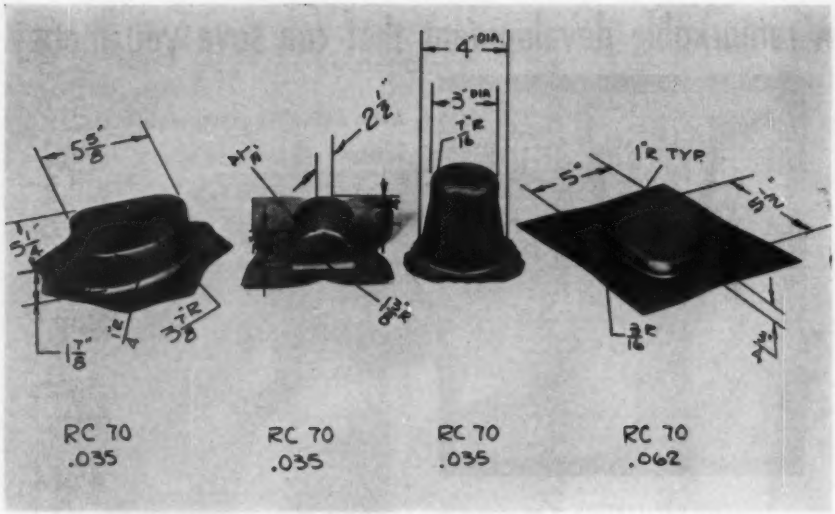

6. Four titanium parts hot drawn in one operation. These parts are RC-70 titanium sheet.

difficulty. Radius at juncture of side with bottom can well be ¼" or even 3/16". On box draws such as that at the left, the radius at side corners is usually 7/16" to ½". Smaller radii can be held at the bottom of a box draw than at the side corners.

Rubber-formed A-70 parts are shown in figures 4 & 5. Rubber forming (Guerin process) is a fabrication method which has long been used by the aircraft industry for the forming of small quantities of parts where bending to contour of small parts is required. Tooling costs are relatively low for rubber forming. Aluminum parts are normally cold formed by this process. Titanium, like magnesium, requires heating for optimum results with this method. The developed blank and the hydro-form die are both heated. Titanium parts are rubber formed without difficulty, using the same techniques as for forming magnesium alloy parts.

Important to remember, in evaluating the depth of draws and the radii possible, is the fact that the parts illustrated here were drawn without difficulty on the first attempts. Had the dies been made for draws of greater depth and sharper radii, more severe draws could have been made. It is impossible at this time to predict the ultimate in drawability. All that can be said now is that parts such as those illustrated can be production hot drawn in one operation.

Apparently anything that can be drawn in magnesium in one operation can be drawn in A-55 and A-70. Although C-110M is more difficult to draw, progress is being made in the development of single-draw techniques. Brooks and Perkins research men are confident that, through close control of conditions, techniques soon will be perfected for the drawing of C-110M to equivalent depth in one operation.

This all adds up to the astounding conclusion that titanium, like magnesium, can be drawn more severely in one operation than can the more common metals such as aluminum, steel and brass.

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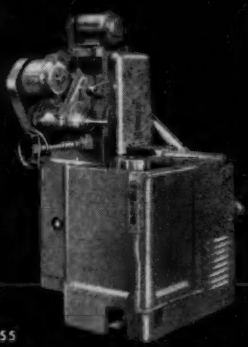
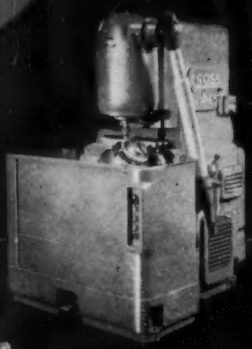


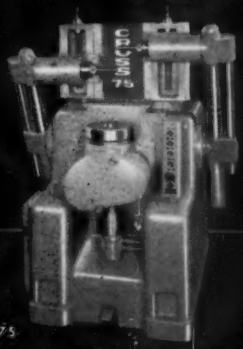
NO. 55

For rounding, pointing, chamfering or burring external and internal—
spur gears • helical gears
clutches • splines
Typical production—rounding or pointing 8 pitch 30 tooth gears—55 net hourly.



NO. 65

For pointing or chamfering external and internal—
clutches • spur gears
bevel gears • splines
Typical production—pointing 10 pitch 30 tooth gears—100 net hourly.



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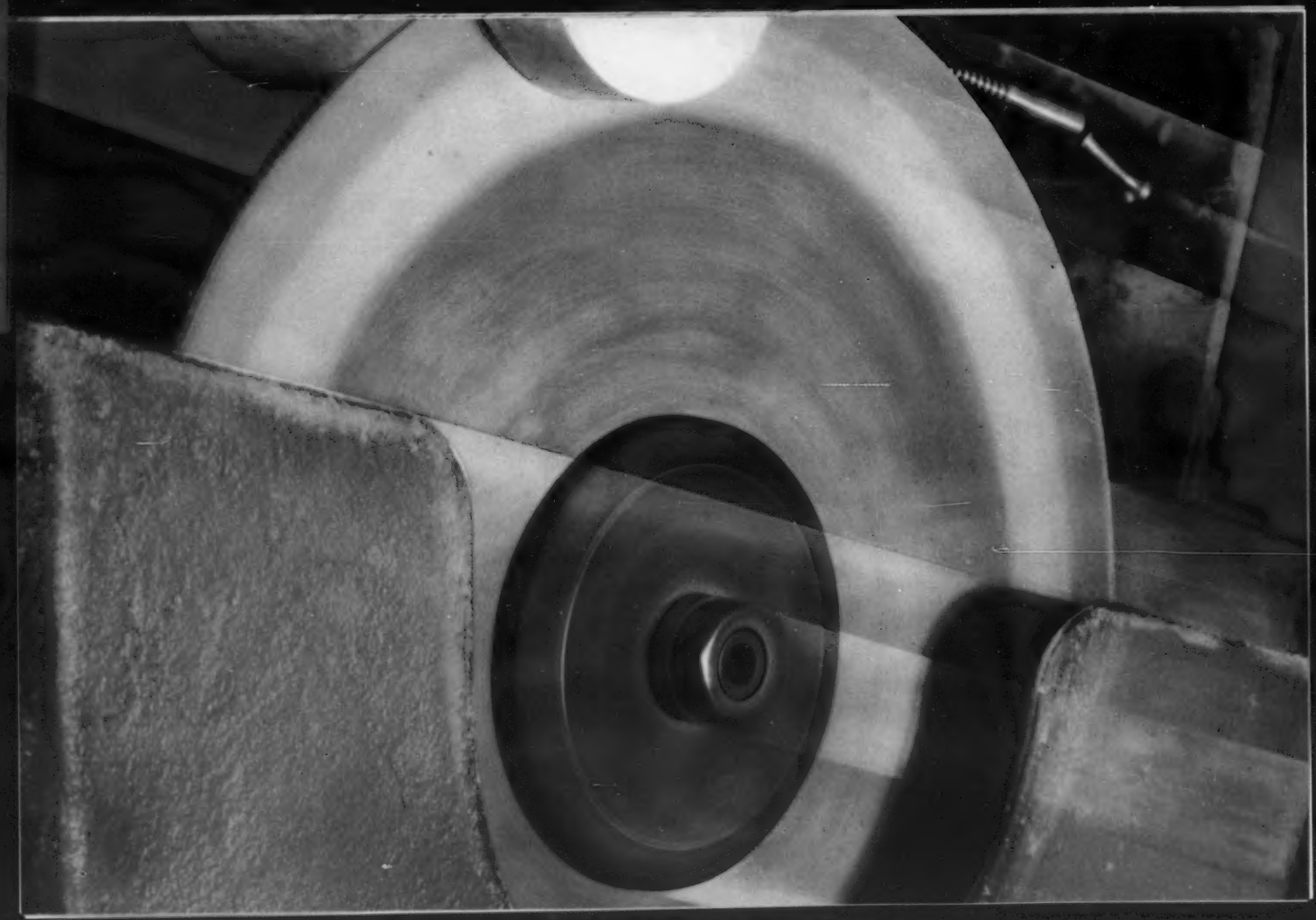

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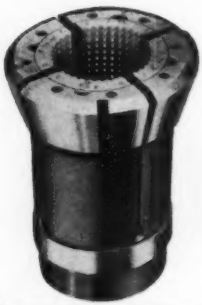

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The End

Specifications of American-built presses.

(For descriptions of these presses see end of this section)

E. W. Bliss Company — **Canton, Ohio**

Type and Model	Capacity	Dia. Crankshaft at Main Bearing and Pin	A=Area of Bed O=Opening in Bed	SH=Shut Height ST=Stroke, Std. and Max.
Arch Presses				
63	95	5"-7½"	A=28" x 31" O=14" x 24"	SH=15"; ST=4"-8"
Gap Frame Enclosed Presses				
1EG-95	95		A=22" x 36" O=12" x 22"	SH=15"; ST=4"
1EG-200	200		A=30" x 46" O=16" x 30"	SH=20"; ST=6"
1EG-350	350		A=38" x 58" O=21" x 36"	SH=25"; ST=8"
1EG-600	600		A=46" x 70" O=23" x 38"	SH=30"; ST=12"

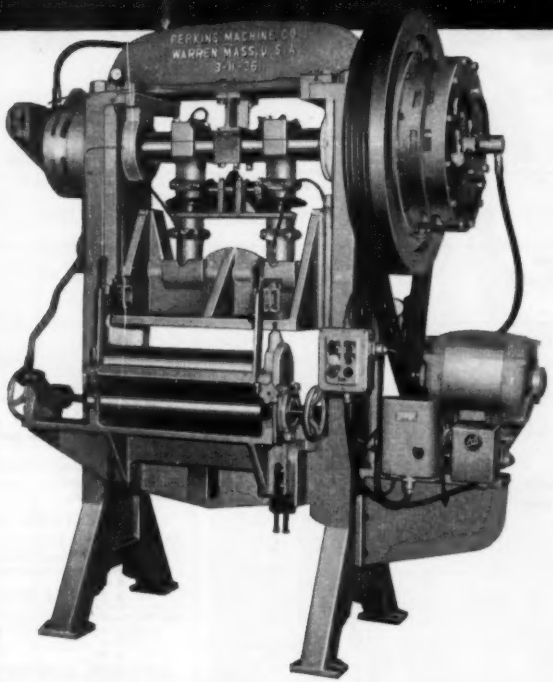
E. W. Bliss Company — **Canton, Ohio**

Type and Model	Capacity	Dia. Crankshaft at Pin	A=Area of Bed O=Opening in Bed	SH=Shut Height ST=Stroke, Std. and Max.
End Wheel Punching Presses (Standard Throat)				
31	15	1¾"	A=10¼" x 15" O=5" x 8"	SH=6"; ST=1½"
32	25	2¼"	A=12" x 17" O=6" x 9"	SH=7½"; ST=1½"-3"
33	35	3⅜"	A=14" x 20" O=8" x 10"	SH=8½"; ST=1¼"-3¼"
34	50	4½"	A=15" x 23" O=10" x 12"	SH=9½"; ST=1½"-4"
35	70	5¼"	A=18" x 27" O=12" x 15"	SH=10¼"; ST=1¾"-4¾"
36	100	6¼"	A=22" x 31" O=14" x 17"	SH=11"; ST=2"-5"
37	135	7¼"	A=23" x 34" O=14" x 17"	do
38	180	8½"	A=26" x 38" O=16" x 19"	ST=12½"; ST=2"-5"
(Deep Throat)				
17	25	2½"	A=15" x 23" O=10" x 12"	SH=7¼"; ST=1¼"-2"
20-A	70	5¼"	A=22" x 31" O=14" x 17"	SH=10"; ST=1¾"-4"

E. W. Bliss Company — Canton, Ohio

Type and Model	Capacity	Dia. Crankshaft at Pin	A=Area of Bed O=Opening in Bed	SH=Shut Height ST=Stroke, Std. and Max.
End Wheel Adjustable Bed Presses				
41-A	15	1¾"	A=10¼" x 15" O=5¼" x 7¼"	SH=4"-12½" Min. and Max. ST=1½"
41-H	15	1¾"	do	SH=4"-30½" ST=1½"
42-A	25	2¼"	A=12¼" x 18" O=6½" x 9"	SH=4½"-12½" ST=1½"-3"
42-H	25	2¼"	do	SH=4½"-32½" ST=1½"-3"
43-B	35	3⅜"	A=14" x 19" O=7" x 10"	SH=4¾"-13¾" ST=1½"-3½"
44	50	4½"	A=14" x 20" O=8" x 11"	SH=6½"-14½" ST=1½"-4"
44-A	50	4½"	do	do
45-A	70	5¼"	A=17" x 26" O=11" x 15"	SH=7¾"-14" ST=1¾"-4¾"
46	100	6¼"	A=22" x 31" O=14" x 17"	SH=8½"-15" ST=2"-5"
47	135	7¼"	A=22" x 36" O=14" x 2[illegible]"	SH=9½"-16" ST=2"-5"
Gap Frame Single-Crank Presses		Dia. Crankshaft at Main Bearing and Pin		
77-A	95	5"-7½"	A=25" x 36" O=19½" x 24"	SH=15"; ST=4"-11"
78-A	115	5½"-8¼"	A=24" x 40" O=13" x 26"	SH=16"; ST=5"-16"
78-½	135	6"-9"	A=26" x 42" O=14" x 25½"	SH=18"; ST=5"-12"
79	160	6½"-9¾"	A=28" x 44" O=12" x 24"	SH=19"; ST=5"-12"
79-¼	190	7"-10½"	A=23" x 47" O=12" x 28"	SH=20"; ST=6"-14"
79-½	215	7½"-11¼"	A=28" x50" O=16" x 27½"	SH=21"; ST=6"-15"
79-⅝	255	8"-12"	A=31" x 53" O=14" x 30"	SH=22"; ST=7"-16"
79-¾	345	9"-13½"	A=40" x 51" O=15" x 33"	SH=25"; ST=8"-18"
79-⅞	440	10"-15"	A=40" x 54" O=15" x 33"	SH=27"; ST=9"-20"
80	550	11"-16½"	A=36" x 60" O=15" x 33"	SH=29"; ST=10"-22"
Arch Presses				
29	32	3"-3½"	A=24" x 24" O=16" x 18"	SH=8½"; ST=2"-6"
30N	45	3½"-4¼"	A=27" x 28" O=18" x 23"	SH=11¼"; ST=3"-6"
30-¾	60	4"-6"	A=30" x 31" O=20" x 24"	SH=13¼"; ST=3½"-7"
30-¾N	75	4½"-6¾"	A=30" x 32" O=20" x 25"	SH=13¾"; ST=4"-8"
36	75	4½"-6¾"	A=24" x 23" O=16½" x 15½"	SH=13¾"; ST=4"-8"

The PERKINS 3-H-36 PRESS



ARRANGED FOR
HIGH SPEED PRODUCTION!

45 Ton Capacity with Air Clutch and Air Brake. Front to back Feed Rolls. Presses of this type built in capacities from 20 to 200 Tons. Bed widths up to 72". Can be furnished plain or geared.

PRESSES BUILT TO SPECIAL SPECIFICATIONS

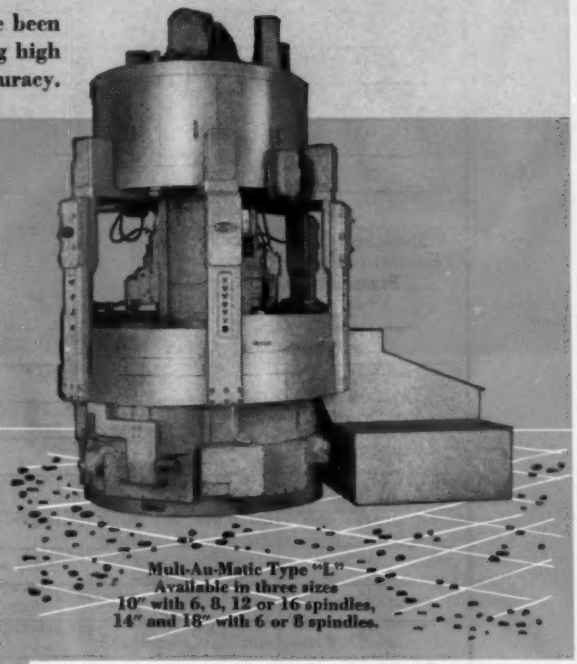
Perkins Power Presses SINCE 1885

PERKINS MACHINE CO.
WARREN, MASSACHUSETTS

E. W. Bliss Company				Canton, Ohio
Type and Model	Capacity	Dia. Crankshaft at Main Bearing and Pin	Area of Bed Min. and Max.	SH=Shut Height ST=Stroke, Std. and Max.
Gap Frame Two-Point Presses (Double Crank Open Type)				
21	32	3″-4″	9″ x 33″; 9″ x 81″	SH=9¼″; ST=2″-6″
23	60	4″-5¼″	11½″ x 39½″; 11½″ x 79½″	SH=13″; ST=2″-7″
25	95	5″-6¾″	22″ x 51″; 22″ x 87″	SH=16″; ST=3″-8″
26	135	6″-8¼″	22″ x 60″; 22″ x 138″	SH=20″; ST=5″-12″
28	290	8″-11¼″	26″ x 83″; 26″ x 155″	SH=28″; ST=7″-16″
(Two-Point Enclosed Type)				
2EG-120	120		28″ x 58″; 28″ x 110″	SH=11″; ST=4″-14″
2EG-180	180		30″ x 72″; 30″ x 138″	SH=13″; ST=5″-16″
2EG-265	265		34″ x 86″; 34″ x 154″	SH=15″; ST=7″-18″
2EG-380	380		38″ x 102″; 38″ x 170″	SH=17″; ST=8″-20″
2EG-850	850		48″ x 134″; 48″ x 200″	SH=20″; ST=10″-24″
Straight Side Double Crank Presses			**Area of Bed and Slide Face, Min. and Max.**	
S2-50	50	4″-5¼″	48″ x 30″; 60″ x 30″	SH=16″; ST=4″-8″
S2-75	75	4½″-6″	48″ x 30″; 84″ x 42″	SH=20″; ST=5″-10″
S2-100	100	5″-6¾″	48″ x 30″; 84″ x 42″	SH=20″; ST=5″-10″
S2-125	125	5½″-7½″	48″ x 30″; 84″ x 48″	SH=22½″; ST=6″-12″
S2-150	150	6″-8¼″	48″ x 30″; 84″ x 48″	SH=22½″; ST=6″-12″
S2-175	175	6½″-9″	48″ x 36″; 84″ x 54″	SH=27″; ST=7″-14″
S2-200	200	7″-9¾″	48″ x 36″; 84″ x 54″	SH=27″; ST=7″-14″
S2-250	250	7½″-10½″	48″ x 42″; 96″ x 66″	SH=30″; ST=8″-16″
S2-300	300	8″-11¼″	48″ x 42″; 96″ x 66″	SH=30″; ST=8″-16″
S2-400	400	9″-12¼″	72″ x 54″; 120″ x 72″	SH=34″; ST=9″-18″
S2-500	500	9½″-13″	do	SH=36″; ST=10″-20″
S2-600	600	10½″-14¼″	108″-60″; 156″-72″	SH=38″; ST=11″-22″
S2-800	800	11½″-15¾″	do	SH=40″; ST=13″-24″
S2-1000	1,000	12½″-17¼″	do	SH=42″; ST=14″-26″
S2-1250	1,250	13½″-18¾″	do	SH=44″; ST=16″-28″
S2-1600	1,600	14½″-20″	144″-66″; 228″-72″	SH=46″; ST=18″-30″
S2-2000	2,000	16″-22½″	do	SH=48″; ST=20″-32″

...a new concept of the...
BULLARD
MULT-AU-MATIC

nce 1914 Bullard Mult-Au-Matics have been idely used in many industries requiring high oduction of parts with repetitive accuracy.



Mult-Au-Matic Type "L"
Available in three sizes
10" with 6, 8, 12 or 16 spindles,
14" and 18" with 6 or 8 spindles.

The **MULT-AU-MATIC** Type "L" incorporates many new developments. Here are some of them:

★ **CONTROL SYSTEM**
All functions of the machine are controlled from conveniently located push buttons with minimum operator effort and maximum safety.

★ **FEED MECHANISM**
Completely new screw type feed works provide a 16" stroke with 81 feed changes ranging from .0025 to .0625

★ **SELECTIVE SPINDLE SPEEDS**
At each station, speed range from 35 rpm to 1,000 rpm allows selection of correct cutting speed to suit operation at each station.

★ **CARRIER INDEX**
New mechanism permits faster indexing of carrier which saves time between cuts.

★ **OPTIONAL EQUIPMENT**
Includes multi-purpose heads, drill heads, tapping heads, precision boring heads, automatic loading and gauging equipment and chip removal conveyors.

SEVENTY FIFTH
BULLARD
ANNIVERSARY

THE BULLARD COMPANY

286 Canfield Avenue • Bridgeport 2, Connecticut

Please send me a copy of the
NEW MULT-AU-MATIC TYPE "L" CATALOG

NAME.....

COMPANY..... POSITION.....

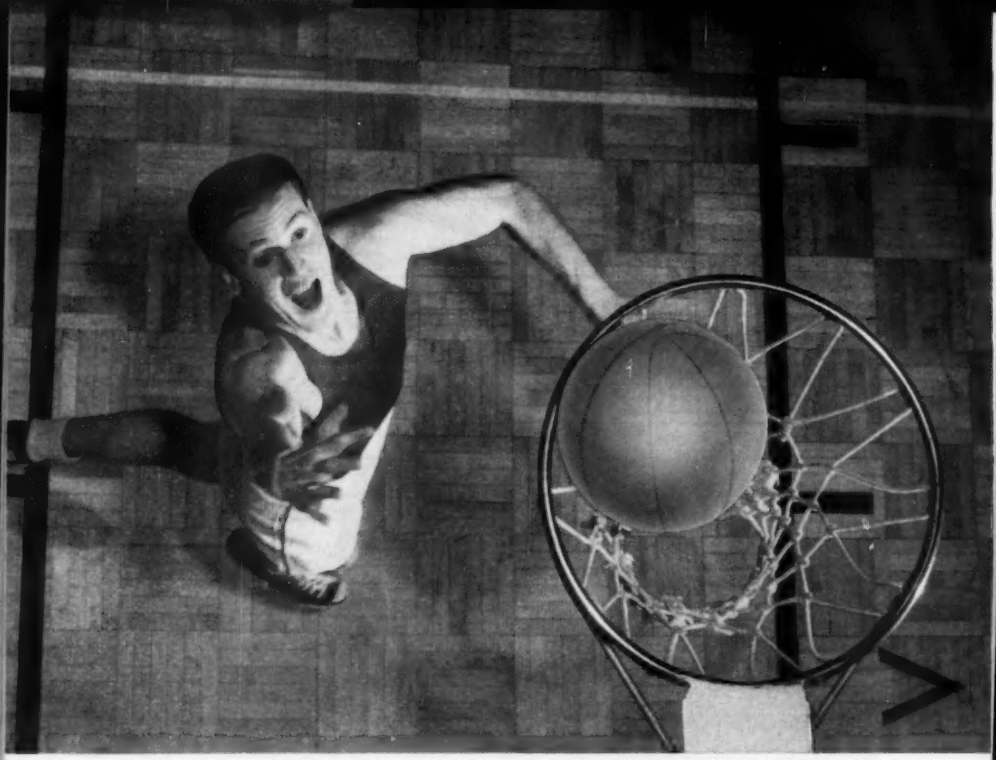
ADDRESS.....

CITY..... ZONE..... STATE.....

For the complete story use this coupon for your copy of the new catalog.

E. W. Bliss Company — Canton, Ohio

Type and Model	Size of Hammer (lbs.)	Dia. Crankshaft at Main Bearing and Pin	A=Area of Bed O=Opening in Bed	SH=Shut Height ST=Stroke, Std. and Max.
Straight-Side Single-Crank Trimming Presses				
204-½	1,200	4½"-6"	A=24" x 22" O=12" x 12"	SH= 14"; ST=4"-8"
206-A	2,500	6"-9"	A=40" x 32" O=20" x 20"	SH=18"; ST=5"-12"
207	4,000	7"-10½"	A=48" x 28" O=16" x 18"	SH=20"; ST=6"-14"
208	7,000	8"-12"	A=54" x 30" O=18" x 21"	SH=22"; ST=7"-16"
210-A	10,000	10"-15"	A=60" x 42" O=20"	SH=27"; ST=9"-20"
212	16,000	12"-18"	A=66" x 43" O=22"	SH=30"; ST=10"-26"
213-A	20,000	13"-19½"	A=66" x 48" O=22"	SH=30"; ST=10"-26"
215	25,000	15"-22½"	A=78" x 46" O=24"	SH=36"; ST=12"-36"
220	33,000	20"-30"	A=98" x 72" O=36"	SH=44"; ST=12"-40"
224	47,000	24"-36"	A=108" x 78" O=36"	SH=48"; ST=12"-44"
Straight-Side Eccentric Shaft Presses	Capacity			
504-½	90	4½"-8"	A=19" x 19" O=7" x 7"	SH=9"; ST=2"-3½"
505	110	5"-9"	A=21" x 21" O=8" x 8"	SH=10"; ST=2½"-4"
506	160	6"-10½"	A=25" x 21" O=10" x 10"	SH=12"; ST=3"-4½"
508	300	8"-14"	A=29" x 25" O=12" x 12"	SH=14"; ST=4"-6"
509	415	9"-15¾"	A=32" x 27" O=12" x 12"	SH=16"; ST=5"-6¾"
510	530	10"-17½"	A=34" x 30" O=12" x 12"	SH=18"; ST=6"-7½"
511	650	11"-19¼"	A=36" x 32" O=12" x 12"	SH=20"; ST=6"-8¼"
513	950	13"-22¾"	A=42" x 41" O=14" x 14"	SH=23"; ST=6"-9¾"
514	1,100	14"-24½"	A=45" x 41" O=16" x 16"	SH=26"; ST=6"-10½"
518	1,875	18"-31½"	A=56" x 53" O=22" x 22"	SH=30"; ST=6"-13½"
Double Crank Inclinable Presses				
102	18	2¼"-2½"	A=10" x 31½" O=6" x 22"	SH=8¼"; ST=2"-3½"
103	22	2½"-3"	A=12" x 39" O=7" x 28"	SH=8¾"; ST=2"-4"
104	32	3"-3½"	A=14" x 44½" O=8" x 32"	SH=9¾"; ST=2½"-5"
105	44	3½"-4¼"	A=18" x 48½" O=10" x 34"	SH=10¾"; ST=2½"-6"
106	58	4"-5¼"	A=21" x 56" O=12" x 36"	SH=11"; ST=3"-7"



Why CIMCOOL wins by two big points . . .

First, because CIMCOOL°—the radically new and different cutting fluid—*lowers costs*. Second, this revolutionary coolant *does a better job*.

Naturally CIMCOOL takes home the trophy. It's a *chemical emulsion*. It replaces all water emulsions and all but a few highly compounded specialty oils. It permits faster speeds and increases tool life because it combines friction reduction and cooling capacity in a degree never before attained. It's longer lasting in machines, so CIMCOOL reduces downtime and cuts labor costs for cleaning and changing.

For a demonstration of how CIMCOOL can score a field goal from every angle, just write us. We'll have one of our Cincinnati Milling-trained machinists call on you—without cost or obligation. Or, if you prefer, write for our free booklet, "Cimcool Defeats Heat." Address Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

°Trade Mark Reg. U.S. Pat. Off.

CIMCOOL

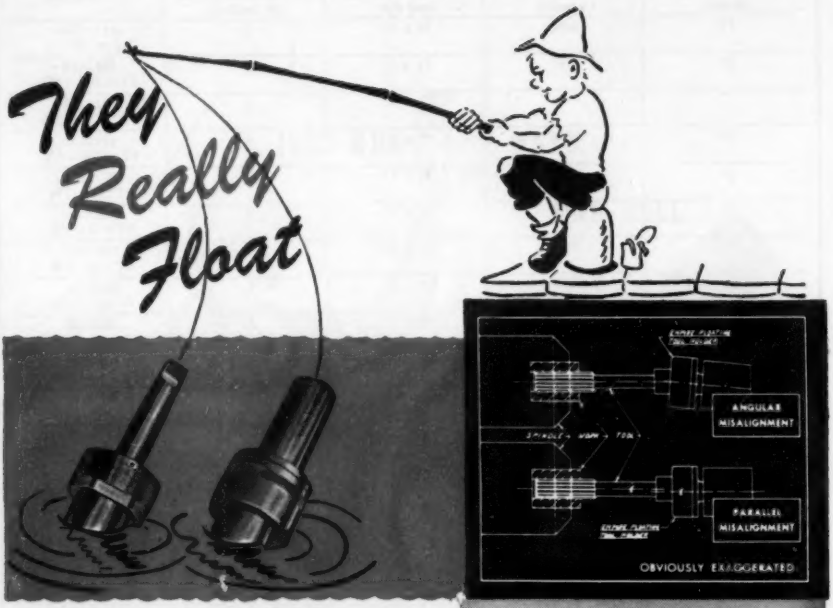
for 85% of all metal cutting jobs

A PRODUCTION-PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.

E. W. Bliss Company — Canton, Ohio

Type and Model	Capacity	Dia. Crankshaft at Main Bearing & Pin	A=Area of Bed O=Opening in Bed	SH=Shut Height ST=Stroke, Std. & Max.
High Production Presses				
612	12	1¾ - 2⅝	A=11½ x 12 O=4 x 10	SH=7 ST=¼ - 1¼
6015	15	2 - 3¼	A=14 x 9 O=6 dia.	SH=7¾ ST=⅜ - 2
625	25	2½ - 3⅝	A=14 x 19 O=5 x 16	SH=7¾ ST=⅜ - 2
6045	45	3½ - 5¼	A=18½ x 13 O=7 x 10	SH=9¼ ST=1 - 3
660	60	4 - 5½	A=18½ x 23 O=9 x 19	SH=11½ ST=1 - 3
660-B	60	4 - 5½	A=18½ x 35 O=9 x 31	SH=11½ ST=1 - 3
660-D	60	4 - 5½	A=18½ x 48 O=9 x 43	SH=11½ ST=1 - 3
6075	75	4½ - 6¾	A=24 x 17 O=9 x 13	SH=11½ ST=1½ - 3½
6100	100	5 - 6¾	A=27 x 36 O=15 x 31	SH=13 ST=1½ - 3½
6100-B	100	5 - 6¾	A=27 x 48 O= 15 x 43	SH=13 ST=1½ - 3½
6125	125	5½ - 8	A=27 x 36 O=15 x 31	SH=13 ST=2 - 3½
6125-B	125	5½ - 8	A=27 x 48 O=15 x 43	SH=13 ST=2 - 3½
6150	150	6½ - 9	A=36 x 41 O=18 x 36	SH=20 ST=2½ - 4
6150-A	150	6½ - 9	A=36 x 47 O=18 x 42	SH=20 ST=2½ - 4
6150-B	150	6½ - 9	A=36 x 59 O=18 x 54	SH=20 ST=2½ - 4
6150-C	150	6½ - 9	A=36 x 71 O=18 x 66	SH=20 ST=2½ - 4
6200-A	200	7 - 9¾	A=36 x 47 O=17⅝ x 41⅛	SH=21 ST=2½ - 4
6250	250	7½ - 10½	A=42 x 48 O=24 x 39	SH=28 ST=3 - 5
6250-A	250	7½ - 10½	A=42 x 60 O=24 x 51	SH=28 ST=3 - 5
6250-B	250	7½ - 10½	A=42 x 72 O=24 x 63	SH=28 ST=3 - 5
6300	300	8 - 11¼	A=42 x 48 O=24 x 39	SH=28 ST=3 - 5
6300-A	300	8 - 11¼	A=42 x 60 O=24 x 51	SH=28 ST=3 - 5
6300-B	300	8 - 11¼	A=42 x 72 O=24 x 63	SH=28 ST=3 - 5
Knuckle Joint Presses				
20	75	16 x 16	4	SH=11 ST=1½ - 2
21	100	13 x 13	1½	SH=11 ST=1½ - 3
22	150	15⅜ x 15	2	SH=12 ST=1½ - 3¼
23	250	17½ x 17½	2½	SH=13½ ST=2 - 3½
24	400	20 x 20	2½	SH=15 ST=2½ - 4

They Really Float



EMPIRE FLOATING REAMER HOLDERS *and* EMPIRE FLOATING TAP HOLDERS

And we do mean float! These floating reamer and tap holders compensate for both out-of-parallel and angular misalignment and permit tap or reamer to float freely—in and out—and will not freeze under tension caused by drag.

By referring to the drawing you will note that the sleeve and shank float independently of each other—achieving a free and easy movement—a unique engineering design not found in any other floating tool.

With the Empire Floating Tool Holder you'll have no more bell mouths or over-sized holes. Holes can be reamed to close tolerances.

Ask about the Floating-Releasing Tap Holder

—that corrects for both parallel and angular misalignment

—that will not strip threads when tap is pulled out

—that permits adjustments of float to threading—right or left hand.

EMPIRE TOOL COMPANY

8780 GRINNELL AVE. DETROIT 13, MICHIGAN

E. W. Bliss Company — Canton, Ohio

Type and Model	Capacity	Dia. Crankshaft at Main Bearing and Pin	A=Bed Area O=Opening in Bed (in inches)	SH=Shut Height ST=Stroke
25	600	28 x 23	3	SH=15½ ST=2½ - 5
26	800	32 x 27	3	SH=16 ST=2½ - 5½
27	1000	37 x 31	3	SH=18 ST=2½ - 5¾
28	1200	40 x 37	4	SH=21 ST=2½ - 6¾
29	1500	44 x 43	4	SH=28½ ST=3 - 7½
30	2000	50 x 51	5	SH=30 ST=3 - 8½
31	2500	50 x 59	5	SH=32 ST=3 - 9½
32	3000	54 x 67	5	SH=34 ST=3 - 10½
33	4000	60 x 70	6	SH=36 ST=4 - 13¼
34	5000	66 x 76	6	SH=38 ST=4 - 15¼
35	6000	66 x 82	7	SH=40 ST=5 - 16
36	8000	72 x 90	7	SH=42 ST=6 - 18
37	10000	80 x 101	8	SH=44 ST=7 - 20½
Straight Side Single Crank Presses				
S1-50	50	4-6	A=21 x 24 O=14 x 14	SH=16 ST=5-8
S1-75	75	4½-6¾	A= 21 x 24 O=14 x 14	SH=16 ST=5-8
S1-100	100	5-7½	A=24 x 30 O=18 x 18	SH=20 ST=6-10
S1-125	125	5½-8¼	A=24 x 30 O=18 x 18	SH=20 ST=6-10
S1-150	150	6-9	A=27 x 33 O=21 x 21	SH=22½ ST=7-12
S1-175	175	6½-9¾	A=27 x 33 O=21 x 21	SH=22½ ST=7-12
S1-200	200	7-10½	A=30 x 36 O=21 x 21	SH=27 ST=8-14
S1-250	250	7½-11¼	A=30 x 36 O=21 x 21	SH=27 ST=8-14
S1-300	300	8½-12¾	A=36 x 42 O=24 x 24	SH=30 ST=8-16
S1-400	400	9½-14¼	A=36 x 42 O=24 x 24	SH=32 ST=9-18
S1-500	500	Ecc.	A=42 x 48 O=27 x 27	SH=34 ST=10-20
S1-600	600	Ecc.	A=42 x 48 O=27 x 27	SH=34 ST=11-22
S1-800	800	Ecc.	A=48 x 54 O=33 x 33	SH=36 ST=13-24
S1-1000	1000	Ecc.	A=48 x 54 O=33 x 33	SH=36 ST=14-24
S1-1250	1250	Ecc.	A=54 x 60 O=39 x 39	SH=38 ST=16-26
S1-1600	1600	Ecc.	A=60 x 66 O=43 x 43	SH=40 ST=18-28
S1-2000	2000	Ecc.	A=66 x 72 O=47 x 47	SH=42 ST=20-30

Here are 6 reasons why Ohio Knife Hardened Bedways are best for you

1. You buy consistent quality at a fixed cost, thus eliminating the uncertainties of producing bedways yourself. When you buy from Ohio Knife you can depend on bedway accuracy, prompt delivery and exact costs.

2. OK ways are so hard they're practically wear-proof, which helps maintain constant accuracy throughout the life of the machine. This extreme hardness, 65-66 Rockwell "C", is uniform to 3/16" depth. The Gisholt Machine Co. demonstrated OK bedway hardness by taking a section from the way, making it into a tool bit, and cutting 1045 cold-rolled steel with it.

3. Because of the OK process of welding hardened tool steel to a soft steel backing (under 2500 tons pressure) we can produce extra long lengths that will not warp or bow even if you store them for long periods before installation. Thus, your high assembly costs of butting short pieces is eliminated.

4. A complete selection of bedway shapes, sizes and lengths is available to you. OK ways can be built to your specifications for any application.

5. Ohio Knife hardened bedways are so well known for their high quality that many machine buyers look for and favor machine tools built with OK ways. So to gain a big sales point, make sure you use OK bedways.

6. OK ways are also available in welded aluminum bronze.

Write to Dept. 32-D for comprehensive bulletin.

Manufacturers for the Metal Working Industry of:

SLITTER KNIVES · SHEAR BLADES · ROTARY SHEAR KNIVES · HARDENED SPACERS · HARDENED WAYS · GIBS · BALL RACES · BRONZE WAYS · WEAR STRIPS

THE OHIO KNIFE CO.

CINCINNATI 23, OHIO

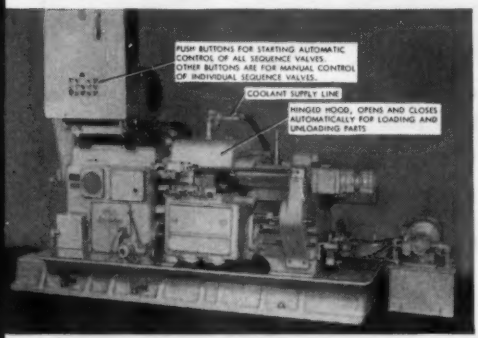
E. W. Bliss Company — Canton, Ohio

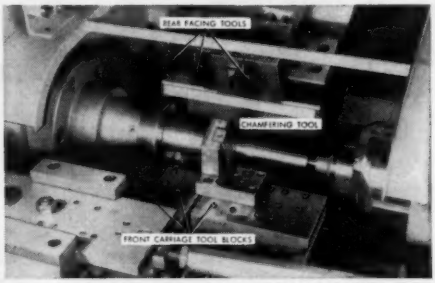
Type and Model	Capacity	Dia. Crankshaft at Main Bearing and Pin	A=Area of Bed O=Opening in Bed	SH=Shut Height ST=Stroke, Std. and Max.
O.B.I.				
18-C	10	1⅞"-2"	A=11⅜" x 15½" O=5" x 9"	SH=7"; ST=1½"-3"
19-C	18	2¼"-2½"	A=12½" x 19" O=8" x 11"	SH=7½"; ST=2"-3½"
19½-B	22	2½"-3"	A=14½" x 23½" O=9" x 13"	SH=7¾"; ST=2½"-4"
20-C	30	2⅞"-3½"	A=17½" x 26¼" O=10" x 15"	SH=8¾"; ST=2½"-4½"
20-B	32	3"-3½"	A=13¾" x 25" O=9" x 12"	SH=10"; ST=3"-4½"
21	35	3¼"-4¼"	A=18¾" x 27½" O=12" x 16"	SH=11¼"; ST=3"-5"
21-S	45	3½"-4¼"	A=19½" x 29½" O=12" x 16"	do
21-B	50	3¾"-5½"	do	SH=12¼"; ST=3"-6"
21½	60	4"-6"	A=22" x 32" O=14" x 18"	SH=13¼"; ST=3½"-8"
23	75	4½"-6¾"	A=24" x 32" O=14" x 18"	SH=15"; ST=4"-8"
28	95	5"-7½"	A=27" x 37" O=16" x 20"	SH=17"; ST=6"-10"
28½	125	5½"-7½"	do	do
29	150	6½"-9"	A=30" x 47" O=17" x 22"	SH=21½"; ST=6"-12"
30	200	7½"-10¼"	A=35" x 53" O=19" x 26"	SH=22½"; ST=8"-12"
Adjustable Bed Horning & Wiring				
16	10	1⅞"-2"	A=10" x 16½" O=5½" dia.	SH=4"-14" (Min. and Max.) ST=1½"-3"
39	18	2¼"-2½"	A=16¾" x 18" O=7" dia.	SH=4¾"-15¾" ST=2"-3½"
39-B	22	2½"-3"	A=16" x 20" O=8" x 10"	SH=5½"-17" ST=2½"-4"
40	32	3"-3½"	A=20" x 24" O=9" x 11"	SH=6"-18" ST=4½"-3"
40-A	32	3"-3½"	A=25¾" x 26" O=12" x 12"	SH=6"-18" ST=3"-4½"
41	45	3½"-4¼"	A=23" x 28" O=10" x 12"	SH=6½"-18½" ST=3"-5"
42	60	4"-6"	A=24" x 32" O=14" x 18"	SH=7"-20" ST=3½"-8"
43	75	4½"-6¾"	A=29" x 35" O=19" x 19"	SH=8"-22" ST=4"-8"
45	125	5½"-7½"	A=29" x 38" O=19" x 27"	SH=10"-22" ST=6"-10"
47	200	7½"-10½"	A=34" x 50" O=22" x 28"	SH=13½"-25½" ST=8"-12"

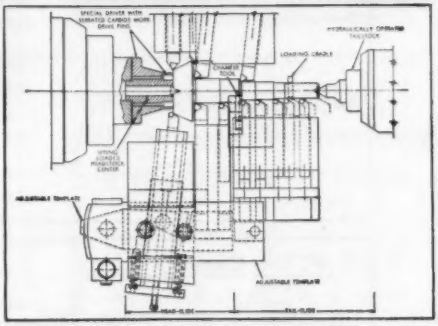
MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. **"THE Lo-swing PEOPLE"** SENECA FALLS, NEW YORK

Hinged hood in open position for loading and unloading parts ▶


PUSH BUTTONS FOR STARTING AUTOMATIC CONTROL OF ALL SEQUENCE VALVES. OTHER BUTTONS ARE FOR MANUAL CONTROL OF INDIVIDUAL SEQUENCE VALVES.
COOLANT SUPPLY LINE
HINGED HOOD, OPENS AND CLOSES AUTOMATICALLY FOR LOADING AND UNLOADING PARTS





Lo-swing LATHE CUTS MACHINING AND HANDLING TIME ON REAR AXLE DRIVE PINIONS

PROBLEM: To finish turn (from end to end) Rear Axle Drive Pinions in one operation and to reduce handling time to a strict minimum.

SOLUTION: A Model AR Automatic Lo-swing Lathe, equipped with Automatic Controls and Serrated Pin Type Driver was selected for this job. The work piece is driven from the gear end by a special driver fitted with serrated carbide pins which indent the large face of the gear. Indentation is obtained by pressure from the tailstock center which is mounted in a hydraulically operated quill. Two pressures, automatically controlled, are used...a high pressure for forming the indent while the shaft is being loaded between centers and a low pressure during the actual machining operation.

This method of driving the work piece permits the machining of all of the gear and stem diameters as well as the facing and undercutting of shoulders in a single operation. Eight carbide front turning tools, one of which is template operated, reduces the length of cut to 2-3/16". This is the length of cut required for the bearing nearest to the bevel gear. The facing, undercutting and chamfering of shoulders are accomplished with four carbide tools mounted on the rear slide. It should be noted that the template is adjustable to handle bevel gears having different angles.

Handling time and operator fatigue are held to a strict minimum by the use of a loading cradle and automatic controls for placing the part between centers, and opening and closing the hinged hood.

The machine stops at the end of the cycle with the spindle stopped, tailstock center retracted, hinged hood open and with the machined part dropped into the cradle. The operator simply replaces the finished part with a rough forging and then pushes two starting buttons, energizing the loader controls, which consecutively close the hood, place the work between centers, indent for the driver pins and finally start spindle rotation. The automatic cycle from then on is controlled by the automatic camming built into the base machine.

The tooling area of the machine is entirely enclosed to protect the operator from flying chips and coolant while cutting at high spindle speeds. Two starting buttons, wired in series, require the operator to use both hands. They are so located that the operator is out of range of the closing hood, thereby preventing accidents.

Control buttons on the door of the starter panel permit normal operation of individual controls and are convenient for setting up and timing loader movements.

Seneca Falls engineering staff is at your disposal to help solve your production problems.

SENECA FALLS MACHINE CO., SENECA FALLS, N. Y.

PRODUCTION COSTS ARE LOWER WITH Lo-swing

E. W. Bliss Company — Canton, Ohio

Type and Model	Dia. Crankshaft at Main Bearing and Pin	Area of Bed	B=Blankholder Slide Area (largest blank) O=Blankholder Opening (largest punch)	SH=Shut Height, Blankholder and Plunger ST=Stroke, Blankholder Slide and Plunger Slide
Single Crank Toggle Presses				
1-½-B	4¼"-4¼"	21" x 20"	B=15" x 15" O=9" dia	SH=16" and 18" ST=6½" and 10½"
3-½-A	5"-5½"	26½" x 25"	B=20" x 20" O=14" dia	SH=19" and 21" ST=8" and 14½"
3-½-B	6"-6½"	28" x 25"	do	SH=20" and 22" ST=10" and 15½"
3-½-C	do	do	do	SH= 24" and 26" ST=11½" and 20"
3-¾-B	6½"-7½"	30" x 29"	B=25" x 24" O=16" dia	SH=28" and 30" ST=15" and 22"
4-A	7"-8"	34" x 31"	B=27" x 27" O=20" dia	SH=30" and 32" ST=15" and 24½"
5-40	8"-9"	40" x 40"	B=38" x 34" O=27" dia	SH=32" and 34" ST=20" and 31"
13-A	9"-10"	40" x 39"	B=38" x 33" O=26½" dia	SH=39" and 41" ST=20" and 31"
13-B	do	52" x 51"	B=50" x 45" O=31" dia	SH=34" and 36" ST=18" and 26"
14-D	10½"-11½"	53" x 52"	B=53" x 44" O=31" x 31"	SH=46" and 48" ST=24" and 36"
High-Production Presses	Capacity	Dia. Crankshaft at Main Bearing	A=Area of Bed O=Opening in Bed	SH=Shut Height ST=Stroke, Std. & Max.
608	12	1¾"	A=11½" x 12" O=4" x 10"	SH=7"; ST=¼"—1¼"
620	27	2½"	A=14" x 19" O=5" x 16"	SH=7¾"; ST=¾"—2"

E. W. Bliss Company — Canton, Ohio

Type and Model	Capacity	Dia. Crankshaft at Bearing	O=Opening in Bed A=Area of Bed	SH=Shut Height ST=Stroke, Std. and Max.
Straight Side Reducing Presses				
83	38	3½"	A=16" x 18" O=8" x 12"	SH=14"; ST=6½"-12"
84	51	4"	A=20" x 19" O=12" x 13"	SH=16"; ST=8"-16"
85½	103	5½"	A=24" x 24" O=14" x 18"	SH=16"; ST=10"-24"
86-A	125	6"	A=30" x 30" O=19" x 24"	SH=18"; ST=12"-26"
86½-A	145	6½"	A=32" x 32" O=21" x 26"	SH=18"; ST=12"-26"
87½	205	7½"	A=28" x 28" O=16" x 22"	SH=20"; ST=16"-30"
88-A	235	8"	A=36" x 36" O=24" x 30"	SH=21"; ST=16"-30"
90	390	10"	A=33" x 33" O=18" x 26"	SH=25"; ST=18"-32"
91A	480	11"	A=42" x 42" O=26" x 34"	SH=27"; ST=18"-36"
93	700	13"	A=50" x 43" O= 28" x 32"	SH=28"; ST=22"-40"

Here's a New Time-Saving Tooling Idea!

COMPLETE STOCKS OF DAVIS BLANK-BAR FLYCUTTERS LET YOU TOOL UP FASTER BY MACHINING ANY SHANK OR PILOT STYLE DESIRED RIGHT IN YOUR OWN SHOP

Now at Davis you can choose from 11 different Super Micrometer-Adjustable Flycutter Tools—4 with 18 inches of blank bar on each side of the cutter, and 7 with unfinished shanks—and save a lot of tooling time and money by machining the bar sections to your own requirements.

Cutter adjustments to within 0.0001" are obtained by merely turning the dial of the simple, sturdy Davis micrometer mechanism. Both heavy roughing cuts and fine finishing cuts can be made with these versatile, precision tools.

Write for Bulletins DB 110 and 112.

7 DIAMETERS OF UNFINISHED-SHANK STUB BORING TOOLS

Davis Stub Boring Tools with Unfinished Shanks handle a range of bores from 1¼" to 7" diameter. Overall length runs from 12" to 19". Diameter and length of the unfinished portion provide ample stock for machining a shank exactly to fit your particular type and size of vertical boring mill, horizontal boring machine, engine or turret lathe, or radial drilling machine.

Immediate Delivery!

4 DIAMETERS OF 36" LENGTH UNIVERSAL BAR BLANKS

Davis Bar Blanks handle a range of bores from 1½" to 4⅝" diameter. Bars are finish ground with a tolerance of ±0.001" over their entire length. With 18" of full diameter blank on each side of the flycutter, tools can be cut to any desired length and provided with taper shanks, drive flats, flange or sleeve mountings, pilot ends, or made into stub bars.

DAVIS BORING TOOL DIVISION OF
Giddings & Lewis Machine Tool Company
Fond du Lac, Wisconsin

THE ONE NAME THAT CERTIFIES ULTIMATE PRECISION AND PRODUCTIVITY IN TOOLING

Danly Machine Specialties, Inc. — **Chicago 50, Ill.**

Type and Model	Capacity (Tons)	Dia. Shaft at Main Bearing	W=Width Between Uprights (inches) B=Bolster Area (inches) BO=Bed Opening (inches)	SH=Shut Height ST=Stroke (Std.)
Autofeed Press (Non-Geared) H2-50	50	4½″	W=30, 36, 48 B=30 x 24; 36 x 24; 48 x 24 BO=22 x 14; 28 x 14; 40 x 14	SH=13″ ST=1″
H2-75	75	5½″	W=36, 48, 60 B=36 x 24; 48 x 24; 60 x 24 BO=28 x 14; 40 x 14; 52 x 14	SH=14″ ST=1″
H2-100	100	6¼″	W=36, 48, 60 B=36 x 30; 48 x 30; 60 x 30 BO=28 x 18; 40 x 18; 52 x 18	SH=14″ ST=2″
H2-150	150	7½″	W=42, 48, 60 B=42 x 36; 48 x 36; 60 x 36 BO=34 x 22; 40 x 22; 52 x 22	SH=14″ ST=2″
Same as above (Geared)	All specs. same as above except Shut Height and Stroke. SH=15, 16, 16, 26; ST=3, 3, 3, 4.			
Two-Point (Eccentric-Gear) H2-200	200	7½	W=48, 60, 72 B=48 x 36; 60 x 36; 72 x 36 BO=38 x 22; 50 x 22; 62 x 22	SH=24 ST=4
H2-250	250	8	W=48, 60, 72 B=48 x 22; 60 x 42; 72 x 42 BO=38 x 28;	do
H2-300	300	9	50 x 28; 62 x 28 W=54, 60, 72 B=54 x 42; 60 x 42; 72 x 42 BO=44 x 26;	SH=26 ST=4
H2-400	400	10	50 x 26; 62 x 26 W= 60, 72, 84 B=60 x 42; 72 x 42; 84 x 42 BO=50 x 26; 62 x 26; 74 x 26	SH=26 ST=5
H2-500	500	11	W=72, 84, 96 B=72 x 42; 84 x 42; 96 x 42 BO=62 x 26; 74 x 26; 86 x 26	SH=28 ST=5
H2-600	600	12	W= 72, 84, 96 B=72 x 48; 84 x 48; 96 x 48 BO=62 x 28; 74 x 28; 86 x 28	SH=30 ST=5
H2-800	800	13	W=84, 96, 105 B=84 x 54; 96 x 54; 108 x 54 BO=72 x 32; 84 x 32; 96 x 32	SH=32 ST=5

E. W. Bliss Company				Canton, Ohio
Type and Model	Capacity	Dia. Crankshaft at Main Bearing and Pin	A=Area of Bed O=Opening in Bed	SH=Shut Height ST=Stroke, Std. and Max.
Double Crank Inclinable Presses				
107	75	4½"-5¼"	A=21" x 56" O=12" x 36"	SH=11" ST=3"-7"
108	95	5"-6¾"	A=27" x 62" O=16" x 42"	SH=17"; ST=4"-8"
109	115	5½"-6¾"	do	do
110	135	6"-8¼"	A=30" x 68" O=17" x 47"	SH=18"; ST=5"-10"
111	160	6½"-8¼"	do	do

Walsh Press & Die Co.				Chicago 44, Illinois
Type and Model	C=Capacity B=Main Bearing Dia.	Opening in Bed Round and Oblong (in inches)	O=Opening Through Back A=Area of Bolster	S=Shut Height ST=Stroke (Standard)
O.B.I.				
6	C=6; B=2¾"	5 x 6	O=7; A=14 x 11	S=6; ST=1½
12	C=12; B=1¾"	5½; 4 x 5½	O=6½; A=15½ x 7½	S=6½; ST=1½
12x	C=12; B=1¾"	do	O=6½; A=18½ x 9½	S=8⅝; ST=1½
18	C=18; B=2¼"	7½; 5 x 7½	O=9; A=18½ x 9½	S=6½; ST=2
20	C=20; B=2¼"	do	do	S=7½; ST=2½
20x	C=20; B=2¼"	9; 7½ x 9	O=9; A=21¾ x 12	S=10; ST=3
24	C=24; B=2½"	9; 6½ x 10	O=9½; A=21¾ x 12	S=6½; ST=2
28	C=28; B=2½"	do	do	S=7½; ST=2½
28x	C=28; B=2½"	do	O=9½; A=26¾ x 14	S=10½; ST=2½
38	C=38; B=3"	10¾; 7¾ x 11¾	O=12; A=26¾ x 14	S=10; ST=2½
38x	C=38; B=3"	do	O=12; A=32¼ x 18½	S=11; ST=4
55	C=55; B=3¾"	15; 10¾ x 14	O=16; A=32¼ x 18½	S=10; ST=2½
65	C=65; B=3¾"	do	do	S=12; ST=4

Descriptions of American built presses

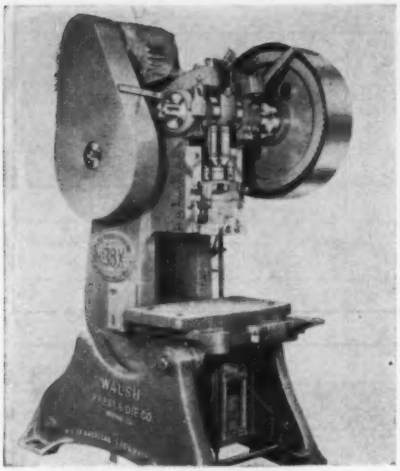
Walsh O.B.I. punch press

Open back inclinable punch presses manufactured by Walsh Press & Die Co., Division of American Gage & Machine Co., 4709 W. Kinzie St., Chicago 44, Ill., have, in many cases, a Vari-Drive motor which makes it possible to change the speed, for example on a 24-ton capacity O.B.I. press, from 70 to 210 strokes per minute while in operation.

To eliminate overheating of the brake, a mechanical "On" and "Off" brake has been installed on these presses. A standard press with Vari-Drive may be used for secondary, single trip blanking, as well as continuous operations by simply changing press speed accordingly.

For high production such as blanking or progressive die operations, O.B.I. high speed machines in various tonnages are used. These presses have a Vari-Drive installed, and a speed range of 160 to 480 strokes per minute on a 12-ton capacity punch press.

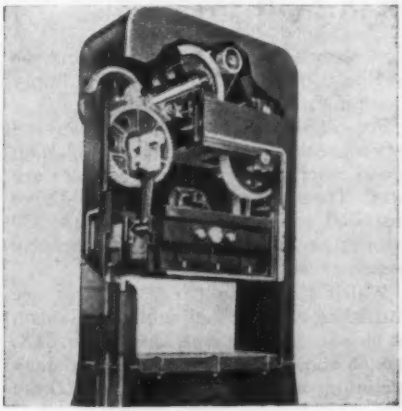
Walsh No. 20 to No. 38 presses are furnished with an inclinable mechanism as standard equipment. On the No. 38X, No. 55 and No. 65 presses a Hydro Jack inclining unit may be furnished. These



jacks may be moved from one press to another.

Bliss straight side, double crank press

These are general purpose presses, suited to any operation falling under the shearing and forming classifications. Where ease in feeding front to back is desired, double crank straight side presses are generally preferred over the corresponding gap frame press.



Straight side double crank presses available in more than 800 sizes, ranging from 32 tons capacity up.

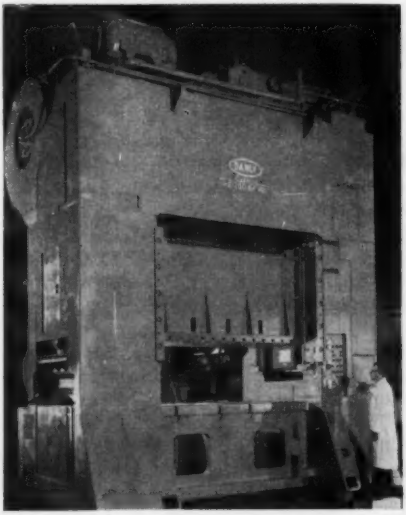
Illustrated is the S-2. Presses conform to the Automotive Joint Industry Committee standards. Frame is tie-rod construction with box-type crown. Side is entirely within gibs during the entire stroke. Manufactured by E. W. Bliss Co., Canton, Ohio.

Danly heavy-duty Autofeed

These presses are of extra heavy construction. The frame, slide, clutch and drive units are of much heavier design for the rated capacity of the press. Deflection and vibration are reduced at higher operating speeds. Presses are coil or strip fed and permit economical automatic operation throughout a wide range of tonnages.

The 400-ton press, illustrated, is equipped with air-cooled, air operated friction clutch, automatic stock feed and scrap cutter. Flywheel is mounted on a stationary quill.

Press is made by Danly Machine Specialties, Inc., Chicago, Ill.



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SPECIALIST!

We make nothing but circular metal cutting saws — the finest you can buy, though they cost no more. All our resources for research and production are devoted to this specialty. Our representatives, too, are specialists on metal-cutting problems throughout industry, with particular reference to the new problems of automation. When you need authoritative advice, we're at your service.

Consult CIRCLE R *Specialists in*:

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CLEVELAND MILWAUKEE PROVIDENCE
DAYTON NEW YORK CITY ROCHESTER
DETROIT PHILADELPHIA ST. LOUIS
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SUPREME QUALITY
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1923 - 1955

CIRCULAR TOOL CO., INC.
PROVIDENCE 5, RHODE ISLAND
Specialists in
Circular Cutting Tools Since 1923

METAL SLITTING SAWS
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COMMUTATOR SLOTTING SAWS
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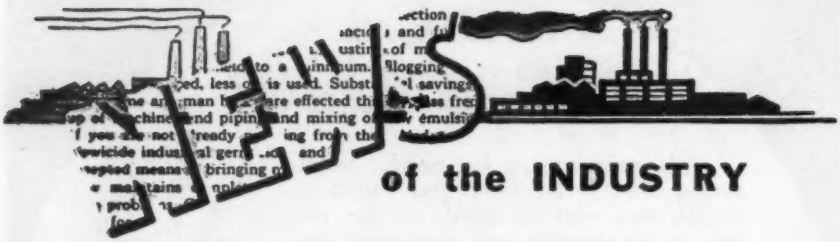
CUT OFF SAWS • CIRCULAR KNIVES & ROTARY SHEAR BLADES • CIRCOLOY STEEL SAWS • SOLID & TIPPED TUNGSTEN CARBIDE SAWS
COMBINED DRILLS & COUNTERSINKS • CENTER REAMERS



Tooling for Western Industrial Expansion Theme for First ASTE Western Exposition

Western industry is attaining a virile maturity which is winning the respect of machine tool builders throughout the land. A firm belief in its continued growth is evidenced by the selection of a theme for the first ASTE Western Industrial Exposition to be held at the Shrine Auditorium and Convention Hall, Los Angeles, March 14-18: "Tooling for Western Industrial Expansion."

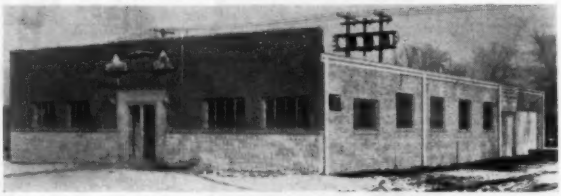
Both the exposition and the ASTE annual meeting, concurrent functions, are keyed to the production problems of western industry's growth.

A continuing surge of expansion that shows no decline in the offing has caused more than 270 companies to contract for booths to display machines, tools and processes best suited to meet the demands of western industry. Executives and engineers of western plants have taken a progressive attitude toward using new tooling developments. This is a prime reason for the industry's phenomenal advancement of the past few years.

Los Angeles area alone has over 12,000 factories and ranks third or better nationally in 27 important industries. The area ranks fourth in the nation in number of plants with over 50 employees. California has over 1800 plants employing more than 20 persons.

The diversification of western industry is an important factor in the need for varied types of tooling, machines and processes. The list of industries in the west includes aircraft, aircraft controls and equipment, chemical products, abrasive materials, tool and die manufacturing, lathes, pumps, die cast products, electronics, automotive assembly and others.

Arthur F. Moul, president, Samuel C. Rogers & Co., Inc., 191 Dutton Ave., Buffalo 11, N. Y., stands behind two reproductions of Rogers industrial grinding machinery that are completely operatable. "Sammy" (at left) is modeled after a machine 17 feet long and "Roger" (at right) after another 4 feet in height. It is claimed that Rogers is the first to make actual working models of steel and aluminum.



The A.I.T. Diamond Tool Co. has completed its move to the new plant at 8221 N. Kimball Ave., Skokie, Ill. A production increase has been made possible through the expansion.

National Broach & Machine Co. celebrates 25th anniversary

National Broach & Machine Co., pioneer Detroit manufacturer of gear production machine tools, inspection equipment and broaches, is celebrating its 25th year of operation. The company was incorporated in Detroit on November 29, 1929. Its founder, the late R. S. Drummond, bought a Dayton, Ohio firm, the National Broach Co., and moved it to Detroit to form the company under its present name.

More than 50 per cent of National Broach and Machine Company's nearly 500 employees have been with the firm more than 10 years. Nine employees of the company, including its current president, Walter S. Praeg, will receive 25-year service pins and engraved gold watches. Mr. Praeg came to Detroit with the Dayton firm and served as the first chief engineer.

Potter & Johnston acquires Newark Gear

Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford, Conn., has announced that its subsidiary, the Potter & Johnston Co., of Pawtucket,

R.I., has taken over the manufacture of products formerly made by Newark Gear, Inc., of Newark, New Jersey. These products include: gear hobbing machines, gear cutting machines, gear testing machines, gear cutter grinding machines, and attachments for these machines.

Wigglesworth Machinery Co. expands

The Wigglesworth Machinery Co., has moved to a new location at 60 Border St., East Boston. The company, which had previously overflowed into four separate buildings at the old Cambridge location, now incorporate a display floor and the executive offices under one roof. The huge demonstration floor allows ample room to display all the machine tools in a single area.

New Detroit sales office

The Barnes Drill Co. has announced the opening of their new sales office

"IN-STOCK" SERVICE ON FAMOUS SPHINX BRAND MICRO-DRILLS

High speed drills for small holes. Sizes from .08 mm (.003") to 1.0 mm (.040") carried in stock, in increments of .01 mm (.0004").

Sphinx brand micro-drills used throughout the world for many years for all fine watch and instrument work.

Send for Bulletin N listing sizes and prices of stock drill sizes and micro-drilling equipment.

These precision drills are available in two styles, flat pivot drills or spiral fluted drills. They are made with concentric oversize shanks. Because of their rigidity they are especially useful in all types of drilling equipment.

LEVIN ® Louis Levin & Son, Inc.

3610 South Broadway • Los Angeles 7, California

in Detroit to serve that area and all eastern Michigan. The office will be managed by **C. O. Holland** assisted by **Hill Nelson, Curt Kahler, Jack Gamrath, R. W. Losey** and **R. M. Palmer.**

Carborundum expands in California

The Carborundum Co., has recently completed two new warehouse and office buildings in California, and has reorganized sales, engineering and other services in the West into what is now designated the Pacific district, which includes the area west of the Rockies. **John G. Fritzinger** has been named manager of the district.

Sales and manufacturing divisions combined

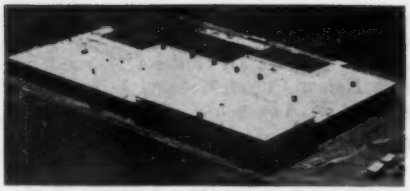
Sales and manufacturing divisions of Aget Manufacturing Company, Adrian, Michigan, have been combined at the company's executive headquarters, 1408

We're Looking for Head Hunters!
US HEADS
Most machine tool men have long relied upon the "US" Adjustable Multiple Spindle Drill Heads. But we are looking for those who still haven't tried them . . . and who are looking for the best.
With their quick-change universal joint assemblies, they are built for continuous use, with full anti-friction bearing construction for high capacity thrust loads. The universal joint adjustable multiple spindle type is suitable for any sensitive drilling machine. Joints are self-lubricating. All gears are hardened and shaved with spindles superfinished.
The single eccentric type is used for equally spaced holes on bolt circles.
The new double eccentric AdjUStatix, two to eight spindles, permits spindles to be located in non-symmetrical paterns. It eliminates expensive change in set-up.
Single eccentric type for equally spaced holes on bolt circles
Universal joint with slip spindle fixed locating plate
Double eccentric type for irregular spacing
Write for details on any type of universal joint adjustable head. Ask also about our totally enclosed gear-driven adjustable, fixed center, or individual lead screw tapping heads.
UNITED STATES DRILL HEAD COMPANY
616-618 BURNS STREET • CINCINNATI 4, OHIO

East Church Street, according to James W. Roberts, general manager. Previously marketing headquarters were at Ann Arbor, Michigan, where sales were made through the company's exclusive agent, Aget-Detroit Co.

To occupy first unit in $2,000,000 expansion

Production will begin early in 1955 in the new building of Southern Screw



Co., Statesville, N.C.

This new plant, first unit in a $2,000,000 expansion program, will al-

SIGOURNEY

M-100

the **PRECISION BENCH DRILLING MACHINE**

No ordinary bench drilling machine, but an extremely accurate, high speed, sensitive machine for precision drilling. Drills from ¼" down to extremely small sizes. Successfully used down as far as .008".

Table and column exactly squared, one to the other, and built with strength and rigidity for maintained accuracy. Hardened and ground spindles insure long life. Sealed ball bearings throughout for smooth operation from 4,000 r.p.m. to 10,000 r.p.m. Motor, driving belt, and spindles entirely enclosed for safety. Available with 1, 2, 3 and 4 spindles.

SEND FOR ILLUSTRATED BULLETIN

THE SIGOURNEY TOOL CO.
HARTFORD 6, CONN.

Sole Sales Agent

PRATT & WHITNEY

Division Niles-Bement-Pond Co. --- West Hartford, Connecticut

15G54

SANFORD BENCH SURFACE GRINDER
MODEL SG

*for Wet*or Dry Grinding!*

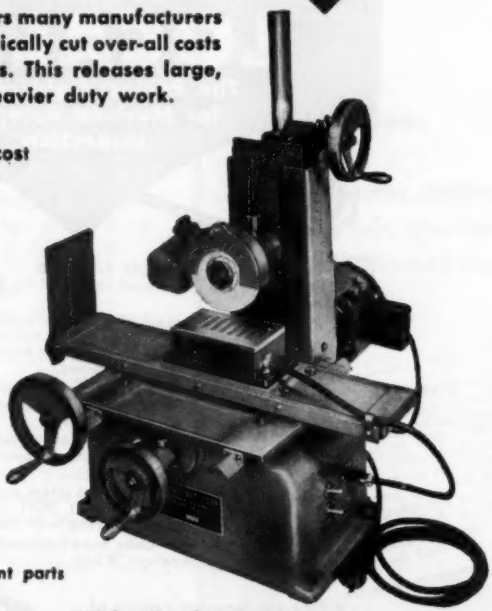
PRECISION • SPEED • SENSITIVITY

A *low cost*, precision machine for surface grinding dies, instrument parts, gauges and other small parts which would fit in the palm of the hand.

By using Sanford Bench Grinders many manufacturers of precision machinery have drastically cut over-all costs for finishing small intricate parts. This releases large, more expensive machines for heavier duty work.

The Sanford SG is the *only* low cost Bench Surface Grinder that

- **Grinds to less than .0001" tolerances**
- **Operates without vibration**
- **Assures long life because Meehanite castings are used in its construction**



SPECIFICATIONS—4" traverse —8" longitudinal—6" vertical under 4" wheel. Approximate weight 160 lbs.

Complete details are included in illustrated bulletin. Send for your copy today.

Reconditioning facilities, replacement parts and special attachments are available. Send for price list.

**With optional equipment*

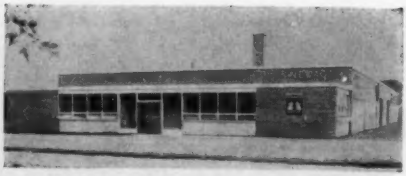
SANFORD MANUFACTURING CORP.
1026 Commerce Ave., Union, N. J.

most double the company's present space and will provide for 600 to 800 employees. Expanded operation plans include dowel screws and lag screws.

Canadian factory for Newage

Newage International, New York, have opened their new factory in Toronto, Newage (Canada) Ltd.

Three main sales and service divisions have been set up: in the machine tool field; the electrical, pump and engine field and in a new division, material handling.



Sensational NEW features

FOSTORIA

LOCALITE

The Perfect Lighting Tool for Machine Assembly Inspection

$8.12 Each in std. pkg. of 8 Less $10.50 ea.

Directs Light Exactly as Needed

MODEL 2-WX-700
Overall Length 31"

Reflector—New bell ventilated shape with 5½" orifice. Rotates 360°. Accommodates 100 watt A-21 or R-30 lamps. Also PAR-38, R-40, RS-40. Available with lens, if desired.

Arm Joints — New patented tension disc design. Easy, smooth action with only one hand. Available with 1, 2 or 3 arms.

Base—Universal for vertical or horizonal mounting. Also adaptable to outlet boxes. Collet revolves 360°.

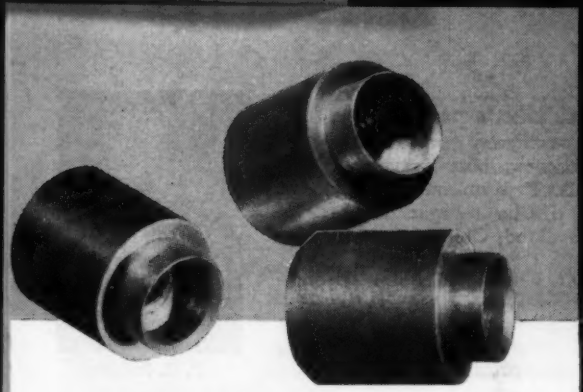
Wiring—Medium screw porcelain socket. "T" rated toggle switch. 8 ft. POT-32 18-2 heavily insulated oil resistant wiring with molded plug.

Finish—Gray baked enamel. Reflector interior, high temperature White.

WRITE for complete catalog of Localite models for every industrial use.

THE FOSTORIA PRESSED STEEL CORPORATION
Fostoria, Ohio
Localites available through wholesalers everywhere

LOCALITE fostoria for Light ON the Job



When it comes to profitable machining—

why pay more when you can get all the speed you need with USS "MX" Screw Stock

A glance at the figures below shows how one manufacturer—who tested USS "MX" with B1113 and high cost stock—lowered his production cost per 1000 pieces with "MX." USS "MX" cost no more than B1113, yet its S.F.M. was greater. The expensive stock gave slightly higher S.F.M. than "MX," *but* the lower cost of the "MX" itself and its *plenty-fast-enough* S.F.M. resulted in the *lowest cost per 1000.* And that, of course, is the most important consideration.

⅝" CLOSED END DRUM NUT

	B1113	USS "MX" OH	High cost stock
Steel cost	$7.55	$7.55	$8.10
Fixed costs	$2.45	$2.45	$2.45
Machine time cost	$3.12	$2.86	$2.72
COST PER 1000	$13.12	$12.86	$13.27
S.F.M.	281	385	421

Very likely similar savings can be yours. Call your nearby U. S. Steel Supply warehouse and one of our salesmen can show you how much you can save with USS "MX." Our stocks also include: cold finished bars, alloy bars, stainless bars, mechanical tubing, aluminum bars.

U.S. STEEL SUPPLY

DIVISION

General Office
208 So. La Salle St.,
Chicago 4, Ill.

USS

Warehouses and Sales Offices Coast to Coast

UNITED STATES STEEL

Call U. S. STEEL SUPPLY for ALL your steel needs...

Structural Shapes
Plates
Bars, Hot and Cold Finished
Sheets and Strip
Alloy Steels
Stainless Steels
Tubular Products
High Strength Steels
Aluminum
Industrial Supplies, Machinery
Reinforcing Bars, Wire Fabric
Floor Plates, Industrial Flooring

FREE . . . Our latest Stock List Contains everything you'll want to know about our huge stocks—including USS "MX" Screw Stock. Tells what's actually in stock at our warehouse nearest you. All data is specific, complete, accurate —and easy to find. Send the coupon today for this big, all-new Stock List.

U. S. Steel Supply, Dept. 325
208 So. La Salle St.
Chicago 4, Illinois

Please send me—without charge or obligation—your latest Stock List.

Name.....

Company.....

Address.....

City.....State.....

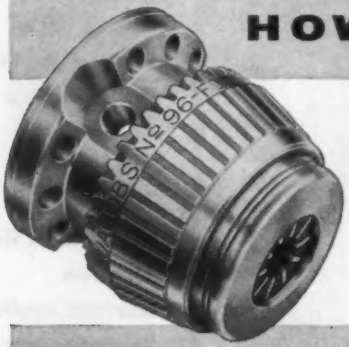
Howard D. Prutton

Son takes father's post

Former company president **D. H. Prutton** became board chairman and **Howard D. Prutton** succeeds him as president of the reorganized Prutton Corp., Cleveland, Ohio.

Formerly named the D. H. Prutton Machinery Co., the firm was operated for 25 years by D. H. Prutton. His son, Howard D. Prutton, joined the company in 1950 as vice president.

D. H. Prutton



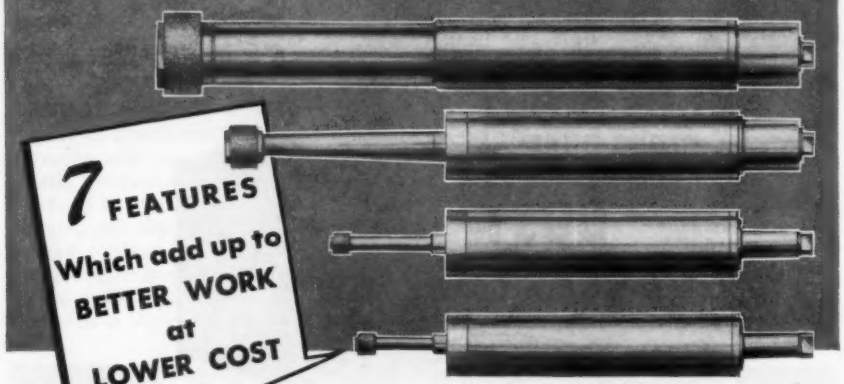
HOW MANY HOLDING JOBS DO YOU HAVE?

How many holding jobs do you have for the new Jacobs Model 96 Rubber-Flex Collet Chuck? Frankly, we don't know all the applications possible for this marvelous holding device. We *do* know it is the most accurate collet chuck in the world . . . that it has a gripping power unmatched by any split steel collets . . . and that it holds any piece from 1/16" to 1 3/8" in diameter — with only 11 collets.

We would like to hear about your work or tool holding ideas for the Model 96. For all the pertinent facts about this new chuck see your industrial distributor, or write directly to The Jacobs Manufacturing Co., 222 Jacobs Road, West Hartford 10, Connecticut. Ask for Bulletin 54-CC.

Jacobs CHUCKS
If it's a Jacobs it holds

Specify POPE
PRECISION INTERNAL GRINDING SPINDLES



7 FEATURES
Which add up to BETTER WORK at LOWER COST

1. **Increased Production.** Pope Spindles speed up output because they can take heavy cuts.
2. **Increased Wheel Life** because the shaft is rigidly supported by bearings of ample size.
3. **Super Precision Bearings** made to Pope specifications and used exclusively in Pope Spindles.
4. **Better Finished Ground Holes.** Pope precision craftsmanship assures work of the highest standard.
5. **Operating Time Saved.** One motor pulley serves all spindles except in unusual applications.
6. **No Additional Lubrication** is ever required. Thirty years of wide factory use has proven the ability of the Pope System of Sealed-in Lubrication to prolong bearing life, reduce maintenance costs and provide cool operation.
7. **Dynamic Balance.** Pope Spindles are dynamically balanced with all their rotating parts in full assembly to insure smooth running.

Pope Precision Internal Grinding Spindles come in the sizes, shaft extensions and speeds (up to 35,000 RPM) to meet your every need.

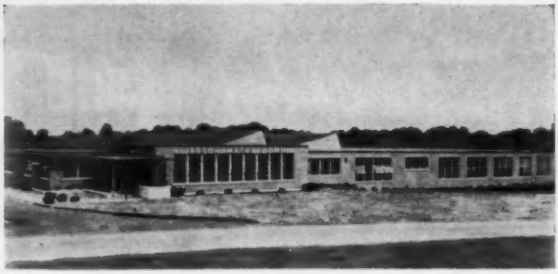
Ask for new catalog No. 57-A

No. 73

POPE
TRADE MARK REG. U.S. PAT. OFF.

POPE MACHINERY CORPORATION
ESTABLISHED 1920
261 RIVER STREET • HAVERHILL, MASSACHUSETTS
BUILDERS OF PRECISION SPINDLES

Wesson Metal Corp. has completed its new 40,000 sq. ft. cemented carbide metals plant at Lexington, Ky., and it is now in full operation.



DUSTKOP®
STOPS DUST

DUST COLLECTORS

SAVES INSTALLATION TIME

Stop dust quickly, at lower cost, with Dustkop. Thirty-seven standard models *ready to use* and available from stock. Dustkop conserves floor space, reduces maintenance. Collects almost all types of industrial dusts. Write for descriptive literature.

Also a complete line of Mist Collectors

AGET MANUFACTURING COMPANY
1402 East Church St. • Adrian, Michigan

New address for Guthery

Guthery Machine Tool Corp., has moved from Manhattan to 38-31 Crescent St., Long Island City 1, N.Y.

Appointments and Promotions

Norton Company, Worcester, Mass., has announced several changes among its outside sales personnel. **Charles M. Wellons** has been named an abrasive engineer and will be responsible for the Philadelphia territory formerly handled by the late **A. Watson Gough. Robert C. Divoll** has been appointed an abrasive engineer responsible for part of the Pittsburgh territory. **Charles R. Garfield** is now a field engineer at the Pittsburgh district office. **William J. Mahan** has been named field engineer for abrasive grain applications in New England (except for Connecticut), and upper New York State. **Joseph F. Hartl** has been appointed sales engineer, abrasive grain, for the state of Connecticut.

Donald L. Harris has recently joined the staff of the Davis Boring Tool Division of Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., as a field engineer.

The appointment of **Lyman K. Shepard** as sales manager of the Wisconsin Drill Head Co., Butler, Wis., has been announced by Henry Schultz, president.

Carl J. Oxford is now vice-president in charge of engineering at the National Twist Drill and Tool Co., Rochester, Mich.

The Star Machine & Tool Co., Minneapolis, Minn., has announced the appointment of **Fred F. Storms** to its sales staff. Storms will call on the territory west of the Mississippi in the capacity of western sales manager.

QUADRO
LIVE CENTERS

SPEED UNIT PRODUCTION
RUGGED • FRICTIONLESS • ACCURATE

QUADRO LIVE CENTERS will take heaviest loads at highest speeds for the longest time. That's why they are specified 8 out of 10 times by factory management. On lathes, millers — any machine tool — you can count on QUADRO CENTERS for closer tolerances, fewer rejects, greatly increased production. Guaranteed!

See your Supply Dealer, or write for full information to:

DAKON
TOOL & MACHINE CO., INC.
NEW HYDE PARK L. I., N. Y.

"TWO DECADES OF IMPORTANT TOOL PARTS PRODUCTION"

E. P. Cunningham

Clearing Machine Corp., Division of U.S. Industries, Inc., recently appointed **E. P. Cunningham** and **A. Clements**, vice-presidents. The announcement was made by Mr. R. W. Glasner, company president. Cunningham was named vice president in charge of sales. Clements, general manager of Clearing's plant in Hamilton, Ohio, will now head this plant as vice president.

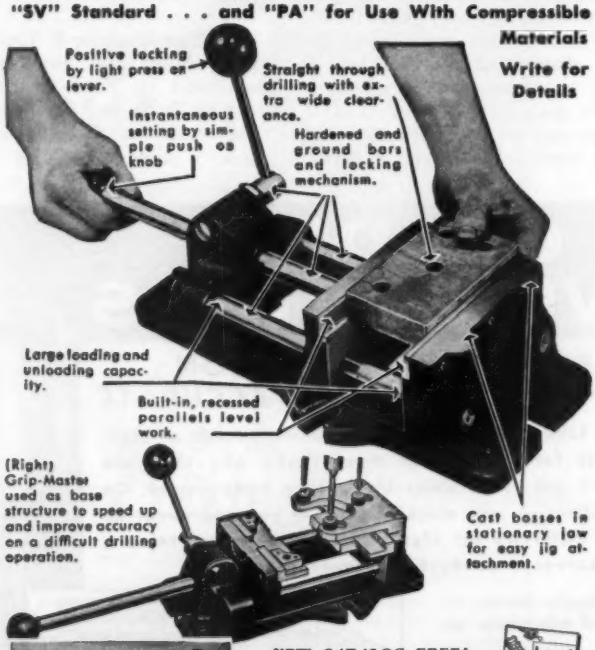
A. Clements

HEINRICH "GRIP-MASTER" SCREWLESS DRILL PRESS VISE

NOW AVAILABLE IN TWO TYPES

"SV" Standard . . . and "PA" for Use With Compressible Materials

Write for Details


Positive locking by light press on lever.
Instantaneous setting by simple push on knob
Straight through drilling with extra wide clearance.
Hardened and ground bars and locking mechanism.
Large loading and unloading capacity.
Built-in, recessed parallels level work.
(Right) Grip-Master used as base structure to speed up and improve accuracy on a difficult drilling operation.
Cast bosses in stationary jaw for easy jig attachment.

heinrich TOOLS, INC.

NEW CATALOG FREE! Be sure you have a complete Heinrich Tool Catalog in your files. Your copy will be sent free upon request.

Dept. 105-B • **RACINE, WIS.**

Drill Press Vises • Fixture Locks • Nibblers
Punches • Rod Cutters

Louis DeMarco

Firth-Loach Metals, Inc., McKeesport, Pa., has appointed **Louis De Marco** vice-president in charge of sales and engineering, and **James E. Gray**, sales manager.

At a meeting of the board of directors of the Taft-Peirce Manufacturing Co., Woonsocket, R.I., **F. Steele Blackall, III** was elected a vice-president of the company. Blackall is also assistant treasurer and a director.

James E. Gray

ECONOMIZE with Morton
. . . FIXTURE CLAMP and COMPONENTS
IMMEDIATE DELIVERY
LARGEST ASSORTMENT OF SIZES AND TYPES IN THE INDUSTRY.
ASSURED QUALITY and SERVICE.
WRITE TODAY
For our Catalog showing our complete line and including full size templates of each Fixture Clamp and Component . . . Save Tool and Designing Costs.
Morton
4
MORTON MACHINE WORKS
2425 Wolcott St., Detroit 20, Mich.

C. A. Chamberlain

E. W. Bliss Co., Canton, Ohio, has announced the appointment of **C. A. Chamberlain** to the position of secretary. He will assume his new duties in addition to those of assistant to the president, a position he has held since January, 1954. **Robert Potter,** vice-president and manager of the Salem, Ohio, division, has assumed the office of assistant executive vice-president. **George Perrault Jr.** is the new manager of the Salem division.

Robert Potter

When you want a "soft" hammer that's

BETTER, SAFER
COSTS LESS AND
LASTS LONGER

That's when you want

C/R Jawhead

They do more work with fewer blows! The secret—less rebound, longer striking contact. Faces won't slip, fly off, crack, or spark. Ideal for delicate parts, finishes. C/R Jawheads cost less. Buy C/R Jawhead from your local industrial supplier.

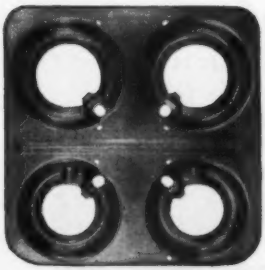
Change faces in seconds. Threaded collar locks them in.

CHICAGO Rawhide MFG.CO.
1301 Elston Ave. Chicago 22, Illinois
In Canada: Super Oil Seal Mfg. Co., Ltd., Hamilton, Ontario

Plastic Low Cost Tooling

For

Dies · · · Drill, Welding, and Assembly Jigs



Vulcan, keeping pace with modern tooling, can recommend plastic tooling for medium production on numerous tool programs.

Plastic tools are light in weight, have good impact, compressive strength and dimensional stability. No hand finishing of parts required as galling or marking is eliminated by using plastic form dies.

Contours and odd shapes are cast or laminated to suit individual tools, saving expensive machine and hand finishing operations.

Plastic tools, built in a matter of days instead of weeks, lower your tool costs for those medium production runs.

Our actual production figures prove plastic has a definite place in modern production.

Vulcan Tool Company's organization, building fine tools since 1916, believes new tooling developments must be proved by tool engineers. Since plastic is not a cure-all your problem should be handled by recognized, practical tool men.

Our engineering staff will recommend the correct plastic material and advise if parts of your tooling program should be in plastic.

Send a part print and your production requirements for quotation and recommendations.

Major Vulcan Services . . . Engineering, Processing, Designing and Building . . . Special Tools . . . Dies . . . Special Machines . . . Vulcamatic Transfer Machines . . . Automation . . . including the Vulcan Hydraulics that Form, Pierce, Assemble and size. Vulcanaire Jig Grinders . . . Motorized Rotary Tables . . . Plastic Tooling.

VULCAN TOOL CO. . . . PLASTIC TOOL DIVISION

727 HIGHLAND AVENUE • **DAYTON, OHIO**

George Perrault, Jr.

Appointment of **Owen C. Davis** as controller and **Floyd Johnson** as manager of the general accounting department has been announced by Vickers Inc., Detroit.

Arnold E. Corwin has been appointed director of a new visitor's reception bureau set up by the S & S Machinery Co., Brooklyn, N.Y.. as a service to out-of-town visitors.

Owen C. Davis

TODAY'S BEST BUY!

Write for Details or See Your JOHNSON DEALER

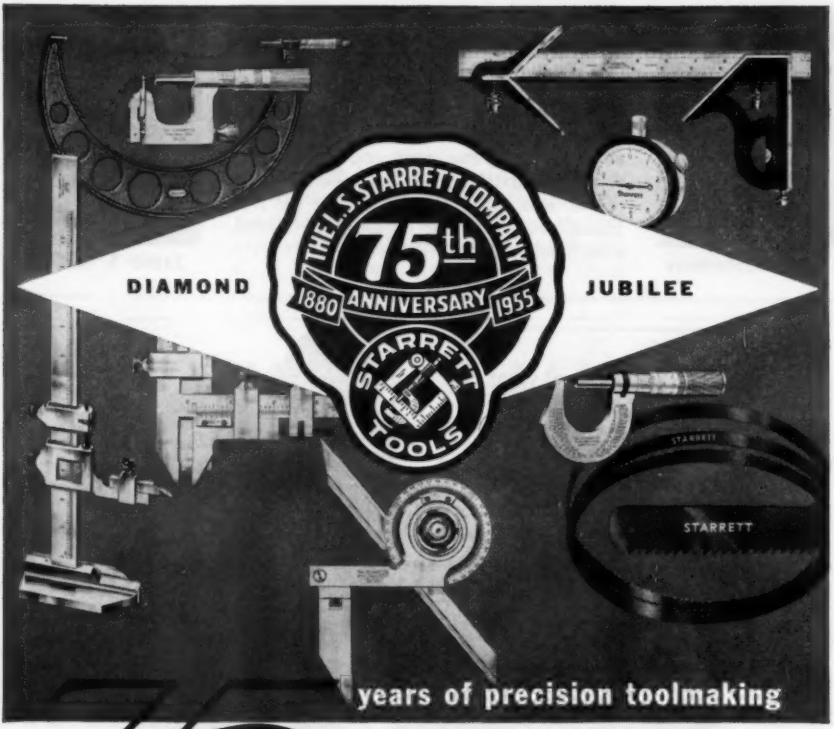
MODEL J
10" x 18" Capacity

BONUS CAPACITY AT NO EXTRA COST

CUTS 10" ROUNDS, 18" FLATS

JOHNSON MANUFACTURING CORP.

1012 Barnes St., Albion, Michigan



75

From the invention of the combination square to a line of more than 3000 fine tools. From a room in a small machine shop to the largest manufacturing plant in the world devoted exclusively to the production of mechanic's hand measuring tools and precision instruments, dial indicators, hacksaws, band saws, band knives and precision ground die and flat stock. This is the contribution made to industry and to millions of skilled craftsmen by Laroy S. Starrett and the company which he founded.

On the occasion of our 75th Anniversary Year, the many distributors who make STARRETT products available to you through a convenient and reliable source of supply join us in our pledge to continue and increase the STARRETT reputation for quality and service.

Starrett®

"WORLD'S GREATEST TOOLMAKERS"

STARRETT TOOLS

MECHANICS' HAND MEASURING
TOOLS AND PRECISION INSTRUMENTS · DIAL INDICATORS · STEEL TAPES
PRECISION GROUND FLAT STOCK · HACKSAWS, BAND SAWS and BAND KNIVES
THE L. S. STARRETT COMPANY, ATHOL, MASSACHUSETTS, U. S. A.

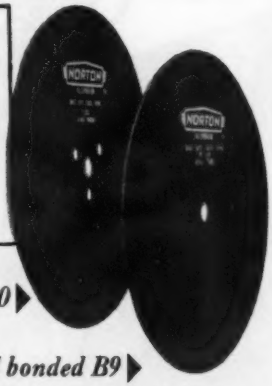
G. B. McManners

Maurice Olsaver has been appointed sales manager of Aget Manufacturing Co., Adrian, Mich.

The appointment of **Lester J. LaMack** as sales manager, **George B. McManners** as advertising manager and **Herb Ainsworth** as district sales manager, Detroit office, was announced recently by Bob Hamilton, president of Dumore Precision Tools, Racine, Wis.

Lester J. LaMack

Users say
These two cut-off wheels top all others



For wet cutting
The Norton rubber bonded R50

For dry cutting
The Norton resinoid bonded B9

Reports covering the broadest range of cutting-off jobs, on ferrous and non-ferrous metals, show the Norton R50 and B9 wheels outperforming competition by a wide margin.

The rubber bonded R50 wheel gets universal praise for its unusual excellence of cut, without burr or burn, in wet cutting jobs. The resinoid bonded B9 — a high speed, high production wheel — is frequently reported to outlast other wheels as much as 5 to 1 in dry cutting applications.

Ask your Norton Distributor about the many profit-boosting "Touch of Gold" advantages these outstanding Norton wheels can add to your own cutting-off operations. Or write to NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Massachusetts.

W-1603

NORTON

Making better products... to make your products better

and its BEHR-MANNING division

NORTON: Abrasives • Grinding Wheels • Grinding Machines • Refractories
BEHR-MANNING: Coated Abrasives • Sharpening Stones • Pressure Sensitive Tapes

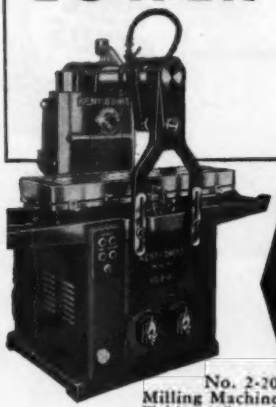
Herb Ainsworth

Dorothy M. J. Tracey was elected president of the Tomkins-Johnson Co., Jackson, Mich., at a meeting of the board of directors recently. She succeeds the late A. R. Johnson, her father, who died April 22.

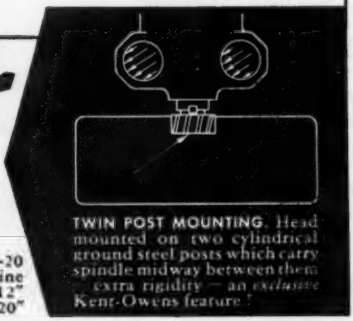
Mrs. E. P. Wilkinson has tendered her resignation as president of the Logansport Machine Co., Inc., Logansport, Ind., and was elected chairman of the board. **C. H. Wilkinson** was elected president.

Dorothy M. J. Tracey

LOWER MILLING COSTS!



No. 2-20 Milling Machine Table, 42" x 12" Table travel, 20"



TWIN POST MOUNTING. Head mounted on two cylindrical ground steel posts which carry spindle midway between them — extra rigidity — an *exclusive* Kent-Owens feature!

Kent-Owens builds 'em *rugged . . . simple . . .* and *versatile . . .* machines adaptable to countless milling jobs. Designed for rapid, easy set-up and cost-saving operation. Extra rigid head mounting assures balanced load. Greater cutting efficiency with smooth, powerful cutter drive—only two gear contacts, motor to cutter. Write for bulletins on wide range of hydraulic and hand-operated machines. Kent-Owens Machines Co., Toledo, Ohio.

KENT-OWENS

Milling Machines

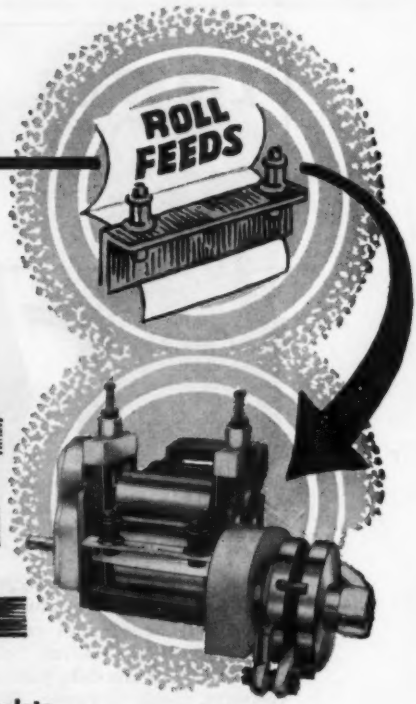
Frank T. Goll

The advancement of **Frank T. Goll** to the post of assistant sales manager of the C. A. Norgren Co. was announced recently by Jack M. Evans, sales manager of the Englewood, Colo., firm. Goll had been head of the order department for the past 18 months.

The board of directors of Torit Manufacturing Co., St. Paul, Minn., has just announced the election of **William L.**

Wm. L. West

"RFC" ROLL-FEEDS



FITS ANY PRESS

For side or rear feeding. All attachments for installing furnished, including disc and connecting linkage.

CAN'T SLIP

Each wedge has four points of contact to safeguard accuracy.

REVERSES INSTANTLY

Merely shift feed finger spring from one lug to the other.

FEEDS IN THOUSANDTHS

Amazingly accurate stock movement assured.

MAINTAINS ORIGINAL SETTING

Regardless of use or wear. No ratchets or pawls to wear down and "Throw off" feed spacing.

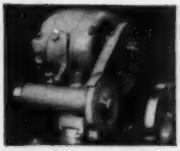
Ready for mounting! Furnished complete.

Write today for latest Bulletin.

EARLY DELIVERY ON STANDARD MODELS

Roll-Feeds Corporation

ASHTON, R. I.


External Grinder

Milling Attachment

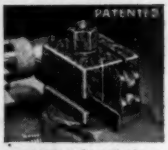
Handlever Tailstock

Handlever Bed Turret

Telescopic Taper Attachment

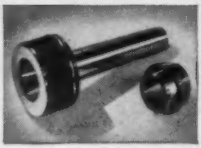
Handwheel Collet Attachment

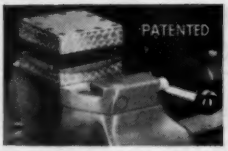
Handlever Collet Attachment



10 in 1 Tool Holder

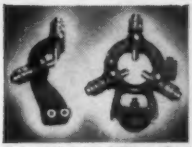
Ball Bearing Live Center


Adjustable Collet Bushing Chuck



Square Turret Tool Block

Handlever Double Tool Cross Slide


Telescoping Jaw Follower Rest and Center Rest

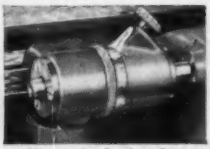
Collet Rack

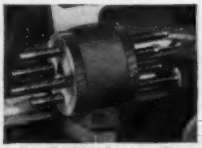
Steel and Brass Collets

Step Chucks and Closers

Centers and Drill Pads

Thread Dial Indicator


Micrometer Carriage Stop


Four Position Carriage Stop

SOUTH BEND

Lathe Attachments

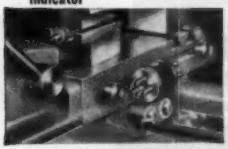
- Cut Production Time
- Simplify Difficult Jobs
- Increase Lathe Versatility
- Speed Up Tooling
- Perform Special Classes of Work
- Reduce Operator Fatigue

Write for Catalog **5418**

SOUTH BEND LATHE

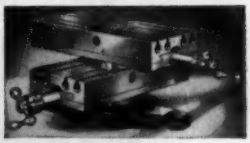
Building Better Tools Since 1906

SOUTH BEND 22, INDIANA


Four Position Cross Slide Stop

Safety and Standard Lathe Dogs

Coolant Pump


Universal Table

West as president.

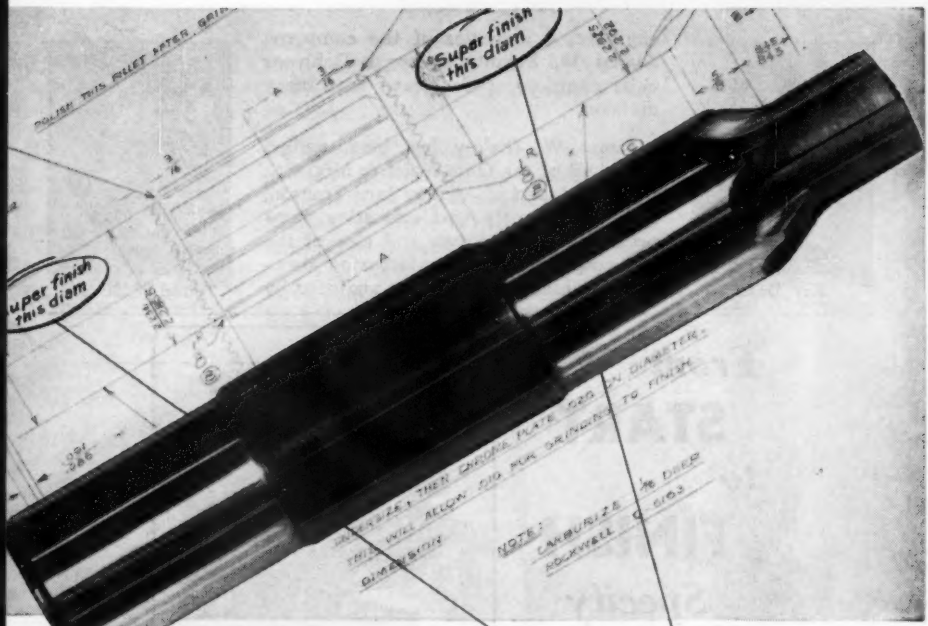
West succeeds **Edward J. Girk** who has resigned from that office in order to devote his time largely to sales promotional activities. Mr. Girk is returning to the office of vice-president and sales manager in which capacity he served for ten years prior to 1952.

Other officers elected were **Lawrence F. Koering**, treasurer, and **George A. Huna**, secretary.

Wesson Co., Detroit, has announced the appointment **of Paul H. Miller**, research engineer, to the research and development staff. For many years, Miller served with the Carboloy Department of the General Electric Co.

Roy Dehn has been appointed director of engineering of the Cleveland Crane & Engineering Co., Wickliffe, Ohio. This is a new position created to integrate the

NATIONWIDE METALWORKING SERVICE ON . . .
OVER 800 DIFFERENT NELCO CARBIDE TIPPED TOOLS!
. . . to fill 90% of all special tool applications!
Whether the job calls for special or standard cutters, check the Nelco distributor in your locality—a Nelco carbide tool to do the job, as quickly and efficiently as any "special" that could be built, is probably on his shelves. Every standard Nelco tool comes in a wide variety of sizes to assure you the cutter you want, when you want it—without delay, without "special tool" cost!
A Nelco field engineer will be glad to call —"troubleshoot" in your plant—on your machines—save you production hours, production dollars!
FOR COMPLETE LISTING AND PRICES OF THE VERSATILE NELCO LINE, SEND TODAY FOR THE NEW NELCO 48 PAGE CATALOG!
NELCO TOOLS
NELCO TOOLS
For that Extra EDGE in Production
NELCO TOOL COMPANY, INC., MANCHESTER, CONNECTICUT



why you should
...ut SUPERFINISH in your blueprints

Longer life, better performance—yes, and *lower costs, too*—should be engineered into the product at the start. For example: when you specify Gisholt SUPERFINISH, you accomplish two things: First, you assure a bearing surface free of the imperfections that cause wear—a surface that will last indefinitely. Second, you cut the cost of grinding—or even eliminate it. Surprisingly enough, you can in most cases achieve this superlative finish at lower over-all cost than is possible with other methods of finishing.

HAVE YOU A COPY OF THIS BOOK?

It's the most complete and authoritative textbook ever published on this important subject. So popular, it is already in its third printing. Fascinating, fully illustrated, yours for the asking. Use the coupon.

THE GISHOLT ROUND TABLE

represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

GISHOLT MACHINE COMPANY

Madison 10, Wisconsin

TURRET LATHES • AUTOMATIC LATHES
SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

Gisholt Machine Company
Madison 10, Wisconsin
Gentlemen:
Please send my free copy of "Wear and Surface Finish."

Name.....*Title*.....

Company.....

Street Address.....

City.....*State*.....

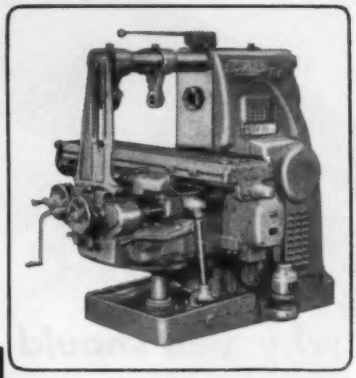
Roy Dehn

engineering activities of the company. **Alfred W. Schultz** succeeds Dehn as chief engineer of the heavy machinery division.

James W. Dickey has been named president of the Ohio Hoist & Mfg. Co., Cleveland, and of Alcaloy Inc., Trenton, N.J. He formerly was executive vice-president of these two and also of the ten round chain manufacturing companies which recently were acquired by

Alfred W. Schultz

From
START
to
FINISH
Specify
RUTHMAN
GUSHER
coolant pumps



Illustrated is a Kearny & Trecker #2 Model CK Milling Machine equipped with a Gusher Coolant Pump.

From the moment you start your Ruthman Gusher Coolant Pump you get copious coolant flow. There is no priming necessary, and your Gusher Pump uses less power when throttled. Pre-lubricated ball-bearings and an electronically balanced rotating shaft assure you of low maintenance cost and trouble-free operation. Specify Gusher Pumps on your metal-working machinery.

THE **RUTHMAN** MACHINERY CO.

1816 READING ROAD CINCINNATI, OHIO

James W. Dickey

Republic Steeel Corp., and which now are known as Republic's Round Chain Division.

Clifford R. Boeckler has been appointed district manager of the new western New York territory office of Niagara Machine & Tool Works. The sales office is located in the firm's plant at 683 Northland Ave., Buffalo, and will serve Niagara and Erie Counties in New York and Erie County in Pennsylvania.

Clifford R. Boeckler

SUPER
STANDARD & SPECIAL Carbide TOOLS
STC

off the press!

OUR NEW AND COMPLETE
CARBIDE TOOL CATALOG

- A completely new carbide tool catalog, shadow indexed for ready reference.
- 92 pages contain complete listings on Super Standard Carbide Tools, sizes and engineering information.
- Many new carbide tools cataloged for the first time, including an extended line of solid carbides.

WRITE:
21650 HOOVER ROAD
DEPT. 347
DETROIT 13, MICHIGAN
OR
5210 SAN FERNANDO ROAD
DEPT. 347
GLENDALE 3, CALIFORNIA

Super
TOOL COMPANY

Logan H. Cashmen

The appointment of **James P. Steibel** as manager of research and development and **Logan H. Cashmen** as purchasing agent has been announced by Bob Hamilton, president of Dumore Precision Tools, Racine, Wis.

James P. Steibel

Brown & Sharpe Mfg. Co., Providence, R.I., has announced the following changes in the sales division: **Earl P. Leeds** has been named director, industrial products sales; **Albert Anforth** has been appointed representative, Los Angeles office.

Earl P. Leeds

Charles E. Vanderpool has been promoted to the position of sales manager for the Rotor Tool Co., Cleveland.

J. H. Williams & Co., Buffalo, N.Y., has announced the appointment of **Dale Bethke** as sales representative for the state of Michigan.

Albert Anforth

The Warner & Swasey Co., has announced the appointment of **Lester M. Cole**, to the position of general sales manager, with headquarters at the main office, Cleveland.

Charles E. Vanderpool

Griffith C. Taaffe has been elected president of Cincinnati Lathe and Tool Co. He joined CL&T as sales manager in 1947 and became vice-president in 1949.

Appointment of **David W. Davenport** to the position of sales manager has been announced by the S-P Manufacturing Corp., Cleveland, Ohio.

Dale Bethke

Lester M. Cole

Griffith C. Taaffe

David W. Davenport

Kenneth P. Martin

Kenneth P. Martin, formerly sales manager of the process machinery division of Cincinnati Milling Machine Co., has been appointed general sales manager of National Automatic Tool Co., Inc., Richmond, Ind.

Dealers and Distributors

Appointment of four new distributors for its Surfindicator line of instruments and accessories is announced by Brush Electronics Co., Cleveland, Ohio. The Surfindicator is manufactured by Brush under license from the General Motors Corporation. H. F. Soderling Co., Seattle, Wash., will represent Brush in the states of Washington and Oregon, and the western portions of Idaho and Montana.; Wepfer Engineering Sales Co., Little Rock, Ark., in Tennessee (west of the Tennessee River), and in the state of Mississippi; D. G. Machinery & Gage Company, Atlanta, Ga., in Tennessee (east of the Tennessee River) and in the states of Alabama, Georgia, and Florida; Longdon Sales Company, Greensboro, N.C., will represent Brush in North Carolina, South Carolina, and most of Virginia.

Ready Tool Co., Bridgeport, Conn., has announced the following distributor appointments: Waltz-Dettmer Supply Co., Cincinnati, Ohio; H. D. Taylor Co., Buffalo, N.Y.; Tocaro Machinery Co., Philadelphia, Pa.; Flack Equipment Co., Dayton, Ohio; Littlejohn Co., Los Angeles, Calif.; Bauer Factory Supply, Irvington, N.J.; Bearings, Inc., Cleveland, Ohio; H. W. Mills & Co., Passaic, N.J.; Chas. A. Strelinger Co., Detroit, Mich.

The Bellows Co., Akron, Ohio, has established a new sales office at 330 Municipal Court Building, Ann Arbor, Mich. **Daniel J. Gurta** has been appointed the field engineer in charge of the new office.

HIGHER SPEEDS! FASTER GRINDING!

kipp

AIR GRINDERS

MODEL JA
50,000 R.P.M.
$42.00
IN U.S.A.

Weight 12 ounces; length 6¾ inches; chuck size ⅛ inch. Wheel guard removed for better illustration.

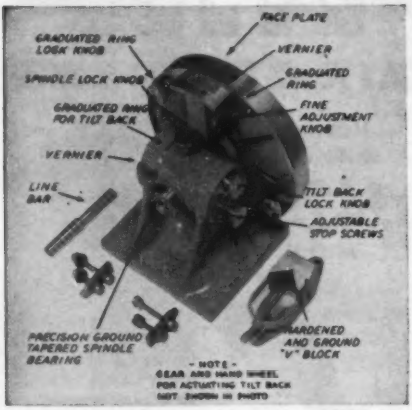
The RPM's stay up while grinding . . . not only when the grinder runs idle. That means better work—longer wheel life.

High speed grinding with small wheels was a Madison-Kipp development of the late twenties. It was born out of a pressing need in our tool room. Because tool room grinding problems are universal, we believe it will pay you to utilize Kipp grinders in your tool room as generally as we do in our own.

kipp

MADISON-KIPP CORP.
207 Waubesa St., Madison 10, Wis., U.S.A.

The COOK "MULTICHECK"



Standard Equipment as shown includes "V" block and clamp, toe clamps, bolts and alignment bar with No. 3 Morse Taper to fit spindle.

Sized in 10" and 12"
Graduated in 5 minutes or 1 minute of 1°

CUT LAYOUT AND INSPECTION COSTS

Realizing the great need in the machine tool trade for some method of speeding up the tedious methods of figuring angles, setting up sine bars, etc. and in order to layout and check precision work, we have designed and can now offer you the Cook Multicheck. As a precision measuring instrument, the Cook Multicheck ranks in importance with the Vernier Caliper and the Height gage.

Priced as Low as $515.00

Write to:

PHILIP COOK & SONS, INC.
2327 DELAWARE STREET
ANDERSON, INDIANA

Ball Machinery Co., Dept. BB, 939 W. Lake St., Chicago, Ill., has been appointed distributor of Prismatic lathes and Abene combination vertical and horizontal milling machines, imported from Sweden.

The Balas Collet Co., Cleveland, Ohio, has announced that its line of screw machine accessories will be available at A. G. Behringer, Inc., 334 N. San Pedro St., Los Angeles, Calif., and in Glendale at Paul & Dudley, 331 W. Colorado Blvd.

Size Control Co. and its affiliate, Wacker Sales, both of American Gage & Machine Co., have been appointed as exclusive agents for the complete line of Riehle portable hardness testers, covering the entire state of Iowa, the northern half of Illinois, and the northeast part of Indiana.

The A. H. Nilson Co. has recently appointed the Four States Machine Co. exclusive distributors covering northern Illinois, western Indiana, southern Wisconsin and eastern Missouri.

Size Control Co., Chicago has appointed Tool Engineer Products Co., Inc. as representative for western Pennsylvania.

Detroit Die Set Corp., Detroit has been appointed authorized distributor of the self-oiling guide pin bushings manufactured by the Powdered Metal Parts Div. of Allied Products Corp.

Don't miss "Leaders of Thought in Industry," this month an interview with Carl J. Snyder, vice-president in charge of production, Chrysler Corporation.

Death Comes to E. Franklin Motch

E. Franklin Motch, president and treasurer of the Motch & Merryweather Machinery Company, Cleveland, O., died at his home in Shaker Heights, O., on January 6. He was 46 years old.

Mr. Motch had been with the company since 1933. In 1946 he became vice-president and treasurer. In April, 1953, he succeeded to the presidency. Mr. Motch was the son of one of the three founders of Motch & Merryweather, the late Stanley Motch, formerly treasurer.

The deceased was a director of Baker Bros., Inc., Toledo, O.; Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.; Gould & Eberhardt, Inc., Irvington, N.J.; the Central National Bank and the Wilson Transit Co., both of Cleveland, and of Motch, Inc., Covington, Ky.

Those who desire may make contribution to the E. Franklin Motch Memorial Fund at University Hospitals, Cleveland 6, Ohio.

Stainless steel resists acid

No. 7-Mo stainless steel has been found to offer resistance to the corrosive attack of certain nitric-hydrofluoric acid solutions, the manufacturer claims.

Test samples of stainless Type 316 and No. 7-Mo were immersed in a solution of 17% nitric acid and 6½% hydrofluoric acid continuously for a period of 117 days.

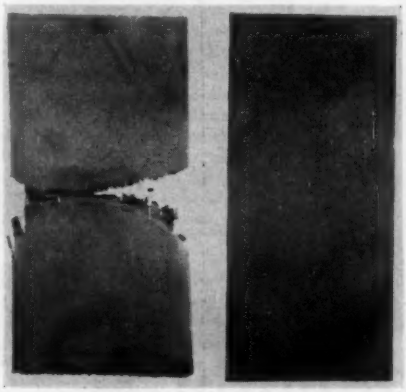
Results indicate that parts and equipment made from the No. 7-Mo stainless might be expected to last eight times as long as those made for Type 316. Although Type 316 is satisfactory for other types of corrosion resisting applications, it took No. 7-Mo to meet these particular conditions.

A factor in the use of No. 7-Mo is that welded structures require subsequent annealing to restore full ductility and corrosion resistance of the metal. This obviates its use for applications (such as tanks) where final annealing is not usually feasible.

The resistance of No. 7-Mo to this solution is noteworthy since this alloy is claimed to be the first metal shown to have commercial resistance to this extremely corrosive mixture of strong acids. Separately the acids are relatively easy to handle. The standard grades of stainless steels are not affected by nitric acid alone. Also the nonferrous alloys that might offer satisfactory resistance to hydrofluoric acid are rapidly corroded because of the nitric acid addition. The Carpenter Steel Co., Dept. B, Reading, Pa.

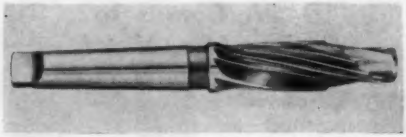
Use ACTION Card, opposite page 64. Encircle No. 76

While corrosive attack on the No. 7-Mo is almost negligible, the nitric-hydrofluoric solution has practically disintegrated the Type 316 strip.



Taper roughing reamer works like a core drill

A Subland type taper roughing reamer, manufactured by Mohawk Tools, Inc., Dept. B, Montpelier, Ohio, is claimed to reduce torque because of the right-hand spiral action of the reamer, which is a free end cutting tool. Flute breakage and wedging is also reportedly eliminated.

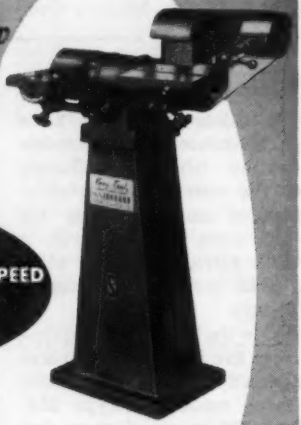


Properly applied, tool can accomplish two to eleven operations at one time. It can be produced with any number of blades for any number of steps and dimensions for production work.

Use ACTION Card, opposite page 64. Encircle No. 73

Standard's new combination grinder and belt finisher

OFFERS ROUGH AND FINISH GRIND FOR HIGH SPEED STEEL AND CARBIDE TOOLS



Standard's leadership again offers users the convenience of "ONE STEP FROM ROUGH TO FINISH GRIND". Tools are rough ground on a silicon carbide wheel and then finish ground on an abrasive belt. The wear resistant platen permits uniform micro finish of end, top and side clearance angles on single point tools *without* diamond wheels or skilled operators. Also available with abrasive belt attachment only.

Type 67
Vari-Tool FINISHER
Price $497—FOB Cincinnati
Prompt Delivery

This Vari-Tool Finisher is the only versatile unit of its kind available today.

Standardize with
the STANDARD electrical tool co.
MACHINE TOOLS
2486 RIVER ROAD • CINCINNATI, OHIO

Whatever kind of gears you make...
Whatever way you make them

National Tool Co.

can supply the right type cutting tool
because we make *all* types

ational Tool Co., with
0 years experience in the
anufacture of special
tting tools, makes *all*
rieties of gear cutting
ols for *all* types of spur,
lical and worm gears
-as well as for sprockets
nd splines. Whatever
our gear requirements
-large or small—Na-
nal engineers can help
u decide the most effi-
ent method of produc-
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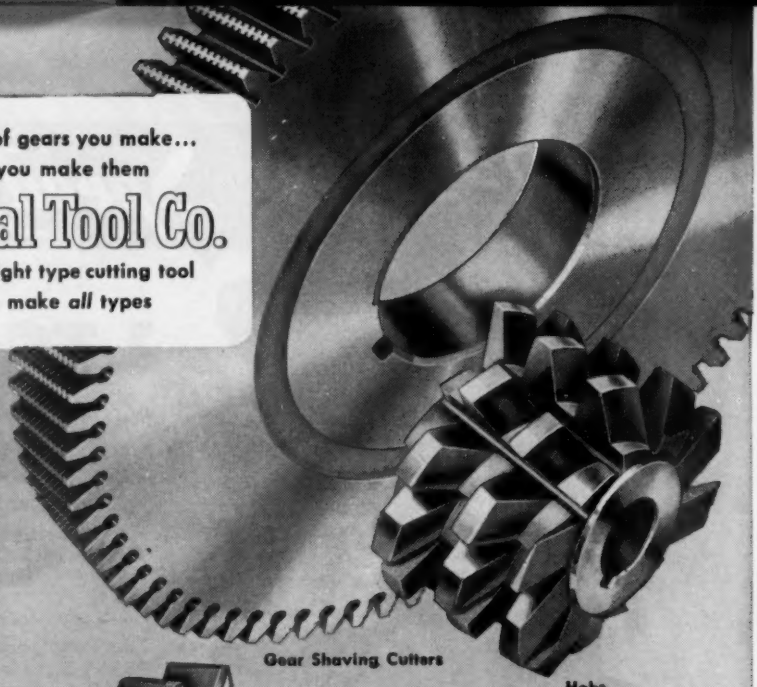
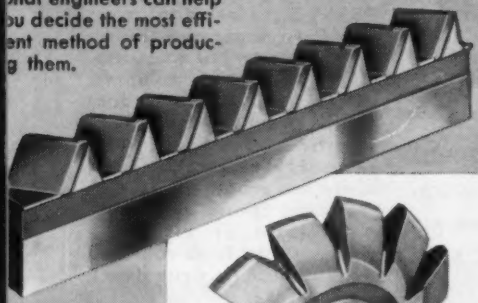


Gear Shaving Cutters

Hobs



Rack Type Gear Shaper Cutters

Gear Shaper Cutters

Involute Gear Cutters

Master Gears

Herringbone Gear Cutters

Representatives in major industrial centers

National
TOOL CO.
Cleveland 2, Ohio

NEW!

Speedy

1 TON

Heavy Duty

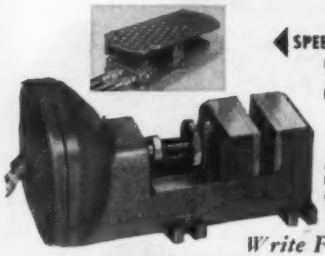
AIR PRESS

No. 80

only $85

This useful, high quality AIR PRESS is the last word in air power engineering—the result of 34 years of specialization in diaphragm compression. Extremely sturdy, it does dozens of jobs formerly handled by expensive presses—and does them more quickly, easily and economically. Operated by Speedy Foot Control, Hand, or Fingertip Valves. Order from your mill supply house or write direct.

★ Heavy grey iron casting, machined surfaces.
★ Power factor—15 times air line pressure of 5 to 150 lbs.
★ Throat clearance to center of 10" diam. circle.
★ Ram clearance 0 to 5", stroke 5/8", table 5" x 5".



SPEEDY AIR VISE No. 60

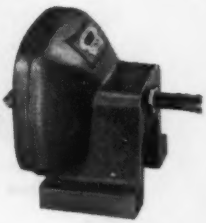
New improved design. Jaws open to 3", 15 times air line pressure. Complete with Foot Control Valve, Air Hose and Fittings.

$44.00

SPEEDY AIR RAM No. 70

Mounts in any position. Compact, extremely sturdy. Exerts gentle pressure to one ton thrust. 6½" high, 5¾" wide.

$35.00



Write For New Complete Catalog

W. R. BROWN CORP., 2651 N. NORMANDY AVE., CHICAGO 35, ILL.

AIR REGULATORS • AIR VALVES • AIR FILTERS • PAINT SPRAYERS • AIR COMPRESSORS

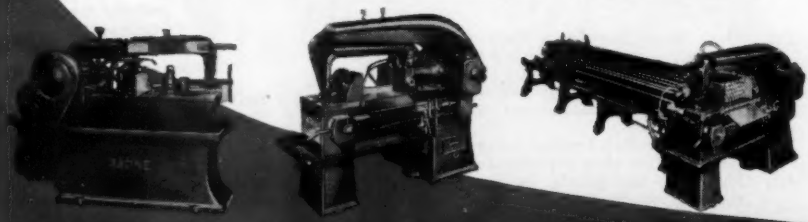
A PROFIT PARADE...

...FROM YOUR SHOP TO YOUR BANK

New, modern, RACINE Metal Cutting Machines step up your entire production. They save material — reduce cut-off time and lessen subsequent machining operation because they are so extremely accurate.

Savings in your metal cutting will help offset ever-mounting tax, labor and material cost. Late model RACINE Power Saws hit costs at the first stage in every metal working job — where the bar or billet is cut to size. All capacities — 6" x 6" to 20" x 20". Single purpose or fully automatic bar feed units.

Write us about your metal cutting needs and catalog of our complete metal cutting saw line. Address: **RACINE HYDRAULICS & MACHINERY, INC.**, 2054 Albert St., Racine, Wis.



RACINE UTILITY MACHINE 6" X 6" CAPACITY

RACINE HEAVY DUTY MACHINE 10" X 10", 12" X 12" AND 12" X 18" CAPACITY

RACINE AUTOMATIC BAR FEED MACHINE 6" X 6", 10" X 10", 12" X 12" AND 12" X 18" CAPACITY

RACINE

MANUFACTURERS OF MACHINERY SINCE 1901

SHELDON

CHICAGO

Sheldon's larger, wider "Zero Inspection", Tapered Roller Spindle Bearings save you money by making these lathes better in 6 ways.

Write for G-55 catalog showing new 10" 11" and 13" swing, bench, cabinet and pedestal mounted Sheldon Precision lathes.

1st They *meet* Sheldon's high standard for accuracy—each bearing has a run out limited to .00015"

2nd They absorb thrust and radial loads beyond requirements—basic rating on front bearing at 500 R.P.M.

for radial loads.....3540 lbs.
thrust loads.....2335 lbs.

3rd They *end* costly bearing maintenance—require only a fractional turn of bearing take-up after long periods of service.

4th They *hold* the spindle in rigid alignment while permitting it to turn freely at high or low speeds—the line contact between rolls and races, and the opposing taper design, preclude lateral movement or end play.

5th They *minimize* friction—smooth mirror finished rollers and races running in light oil, deliver more horsepower at the Spindle Nose and lower power costs.

6th They *increase* work capacity. Larger than similar type bearings on other lathes in this price range, these bearings make it possible to turn out *more work* and *better* work at lower costs.

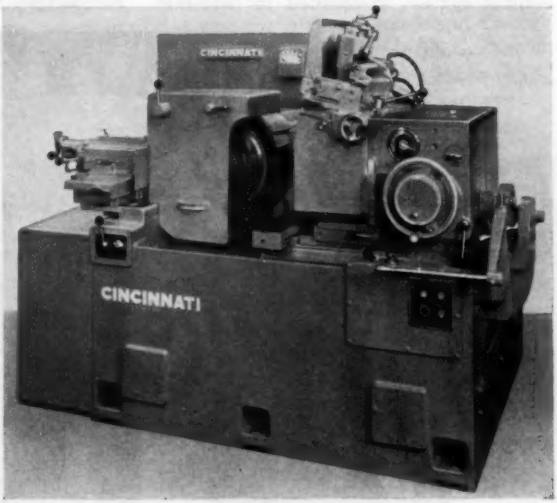
SHELDON MACHINE CO., INC.

4242 NORTH KNOX AVE. • CHICAGO 41, ILLINOIS

What's new in Metalworking

New No. 2 Centerless Grinding Machine Is Heavier, Has Added Features

A completely new No. 2 centerless grinding machine, recently announced by Cincinnati Grinders Inc., Dept. BB, Cincinnati 9, Ohio, is more than 1000 pounds heavier than its predecessor, and incorporates many new features.



Filmatic bearings have been retained for the grinding wheel spindle. They are self-adjusting for all conditions imposed by the grinding action; automatically lubricated with filtered oil from a circulating system, and protected with an electrical pressure switch.

A lower slide unit, mounted on bed ways at right angles to the grinding wheel spindle, supports an upper slide

unit which carries the regulating or "feed" wheel. This type of construction is claimed to simplify setups and sizing adjustments, because the workrest is mounted on the lower slide, where it can be readily positioned in proper relation to the two wheels. Way bearing surfaces are well guarded to exclude grit and cutting fluid. To compensate for slight errors in truing and/or setup, the entire regulating wheel pile may be swiveled slightly on the bed.

In operation, the upper and lower slides are locked together and glide as a unit over anti-friction ways on the bed. Stick-slip, common to plain flat bearings, is virtually eliminated, resulting in accurate sizing adjustments and elimination of scoring the ways.

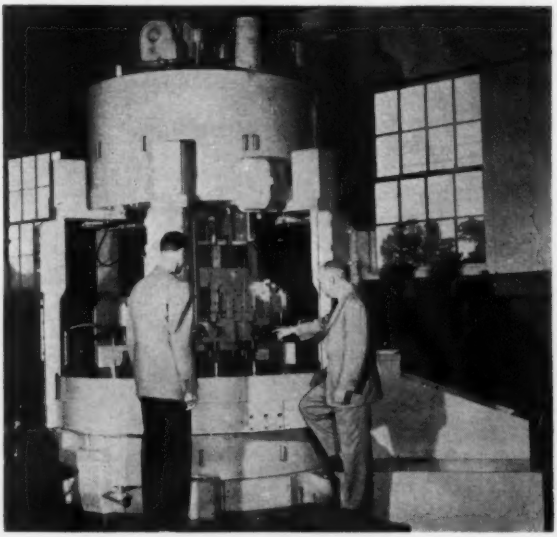
The regulating wheel is driven by a 1½ hp motor, through a back gear combination and a wide V-belt. Regulating wheel speeds are infinitely variable, within two ranges, from 11 to 320 rpm. Speed changes are accomplished with variable pitch sheaves, handwheel selected and indicated on a large tachometer dial at the operator's working position.

Power operated profile truing is standard equipment for the grinding wheel. It is actuated by a hydraulic motor at one end of the unit. Two external controls are located on the operating side of the bed, one to engage rapid and truing rates and change the direction of traverse, and the other changes the rate of traverse. The truing unit is designed for formed cylindrical cams. Flat bearing ways on the truing slide are guarded to exclude dust.

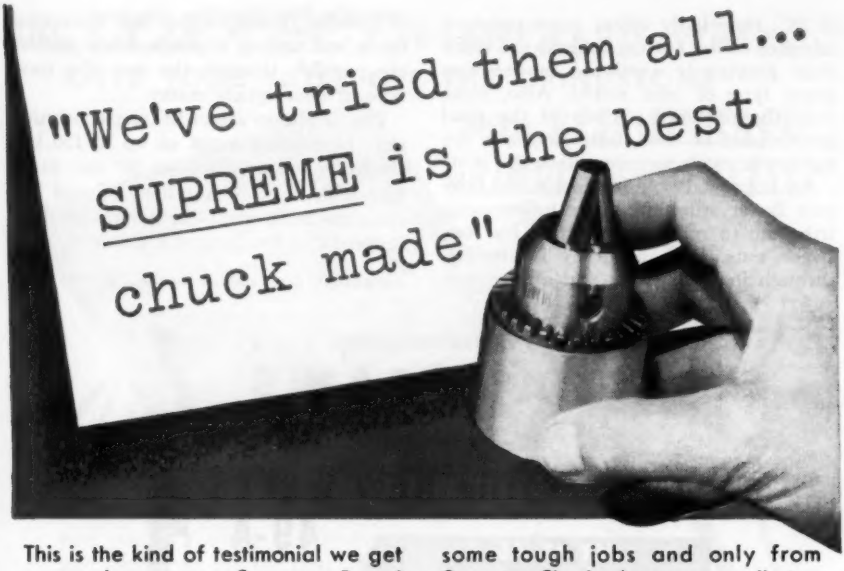
Use ACTION Card, opposite page 64. Encircle No. 1

Bullard Announces New Line of Mult-Au-Matics

The Type L Mult-Au-Matic is Bullard's latest version of their multi-spindle vertical chucking machine. The control system is claimed to facilitate head setting and tool adjustment with a minimum of effort on the part of the operator. A new screw type of feed mechanism has a total available stroke

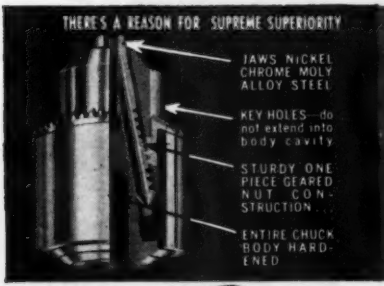


H. Edward Neale, (right) assistant sales manager of the Bullard Co., points out an interesting feature of new design Type L Mult-Au-Matic to Andrew C. Lindmark, supervisor of advertising engineering.



This is the kind of testimonial we get every day on our Supreme Brand Chucks. Users report getting more production, more accurate work, more all-around satisfactory performance from Supreme. One fellow down in Texas even writes that he removes all chucks except Supreme that come on new tools he buys and replaces them with Supreme. He says—"We do some tough jobs and only from Supreme Chucks do we get really top service."

This kind of enthusiasm warrants your attention. Ask your distributor to let you try a Supreme Brand Chuck on one of your own machines. You'll find out in a hurry why more and more tool experts are saying—"Supreme is the best chuck made."


THERE'S A REASON FOR SUPREME SUPERIORITY
JAWS NICKEL CHROME MOLY ALLOY STEEL
KEY HOLES—do not extend into body cavity
STURDY ONE PIECE GEARED NUT CONSTRUCTION
ENTIRE CHUCK BODY HARDENED

Toolmakers switching, too

Supreme Chucks are used by 21 out of 24 leading power drill manufacturers on all or a portion of their output.

Supreme Chucks
BRAND

2222 S. Calumet Ave., Chicago 16, Illinois

of 16", reportedly offers more constant advance of the cutting tools to the work than previously available in the cam drum type of feed works. Also, since only the required portion of the total stroke need be used, time-saving in the automatic cycle is accomplished.

An improved type of mechanism permits faster spindle carrier index, contributing to reduction of time lost between cuts. High accuracy is attained through index registry and a new type of spindle bearing mounting. Selective feeds and speeds at each work station are possible through the use of a new type of gear synchronizer.

The machines are of heavier construction, permitting input of up to 150 hp. Machines are available in 10" size built with 6, 8, 12 or 16 spindles; 14" and 18" sizes are built with 6 or 8 spindles. The Bullard Co., Bridgeport 2, Conn.

Use ACTION Card, opposite page 64. Encircle No. 2

Announcing . . .

2 BANDSAWS in 1

The Versatile NEW WELLS 49-A

USE IT AS A VERTICAL BANDSAW

In this position the New Wells 49-A is a Utility Upright Bandsaw for vertical cutting of angles, slots, notches, bevels and contour work. Ample power, efficient (3 speed) V-Belt Drive and sturdy construction assure smooth, even cutting.

USE IT FOR HORIZONTAL CUT-OFF

In this position your dual purpose New Wells 49-A becomes an Efficient, Economical Horizontal Cut-Off Saw that will handle "man sized" cut-off jobs in large or small shops. It's an ideal tool for "job-site" work and handy for maintenance or utility work.

Write today for complete information.

Wells

Products by Wells are Practical

METAL CUTTING BAND SAWS

WELLS MANUFACTURING CORPORATION
707 COOLIDGE AVE. THREE RIVERS, MICH.

THE *CORRECT* BLANCHARD WHEEL
GETS YOUR NOSE OFF THE GRINDSTONE
... WITH ***BEST SURFACE GRINDING RESULTS!***

BLANCHARD SURFACE GRINDERS give you peak production and economy when maintenance is performed on schedule, and when you use the best wheel for each job.

For more than 25 years, Blanchard has been making wheels that do their jobs in less time, with less trouble and cost . . . whether the work is tough as copper or fragile as glass . . . whether it requires heavy roughing cuts or clean-up cuts with flatness of .000005" to .000010" and finish of 1 to 3 micro-inches.

Our quarter century of experience has proven that Blanchard grinders perform best with Blanchard wheels...on every job!

SEND
FOR OUR *NEW, FREE FOLDER*
on Blanchard cylinder, sectored and segment wheels — in silicate, resinoid and vitrified bonds.

PUT IT ON THE
BLANCHARD

THE BLANCHARD MACHINE CO.
64 STATE STREET • CAMBRIDGE 39, MASS., U. S. A.

Gentlemen:

☐ Please send new *Blanchard Wheel and Segment folder.*

☐ Please send *The Art of Blanchard Surface Grinding.*

NAME_____

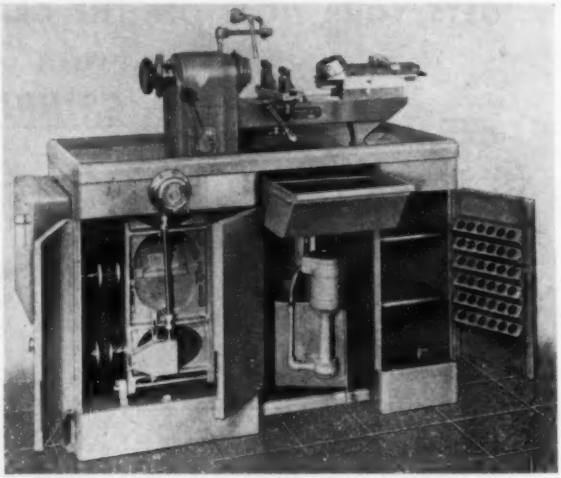
TITLE_____

FIRM_____

STREET_____

CITY_____ ZONE_____ STATE_____

Drive Permits Reversing Spindle Shaft Without Reversing Motor



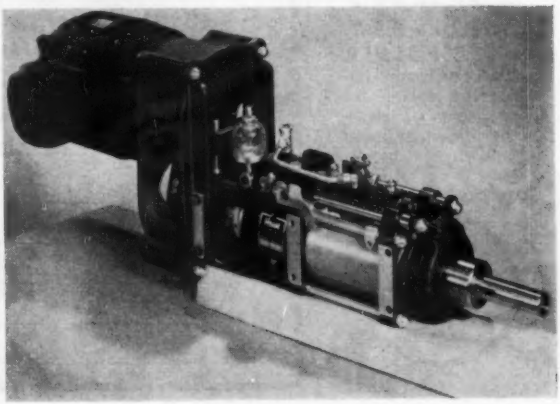
The Wade No. 73 hand screw machine permits continuous reversal of spindle direction without any resulting motor problem, because the motor always runs in one direction. The gear box drive has a new clutch arrangement providing mechanical reversing. Helical gears in constant mesh, together with a clutch yoke and variable pitch drive pulley, comprise the basic features of the drive.

Manual changing of belt positions to accommodate speed variation is done away with, since a positive drive timing belt replaces the V-belts previously used. The variable pitch pulley on the motor shaft provides stepless speed control through a worm and worm gear operated by a handwheel. 100 to 3500 r.p.m. range.

5:1 High-Low spindle speeds are provided with the flip of a lever; can also brake spindle while motor runs. The Wade Tool Co., Dept. BB, Waltham, Mass.

Use ACTION Card, opposite page 64. Encircle No. 3

Self-Contained Drill Unit Uses Timing Belt or V-belt Drives



Model 34 Holomatic drill unit has a self-contained electric motor-pulley drive system designed to use either timing belt or V-belt drives for power transmission from the motor to the spindle; speeds from 300 rpm to 10,000 rpm.

Electric motors of ½, ¾, 1, 1½, and 2 hp are available. Work loads of up to 200-pound inches of torque can be accomplished. An automatic hydraulic oil filling sys-

WHERE R-B Punches cut your costs

IN DIE DESIGNING

. . . you save "board time" by working with the standardized R-B concept of punches, die buttons, punch retainers and die button retainers. R-B standardized equipment reduces drafting time to cut your costs.

IN DIE CONSTRUCTION

. . . you save "building time" because R-B punches, die buttons, punch retainers and die button retainers are furnished completely finished. R-B saves skilled die-maker's time to cut your costs.

IN DIE OPERATION

. . . you save "press time" because R-B punches and die buttons are instantly removed and replacements quickly inserted. Inherent accurate alignment and positive locking keep press down-time at a minimum to cut your costs.

Use R-B Engineering Service for Your Tough Piercing Problems.

RICHARD BROTHERS PUNCH DIVISION
ALLIED PRODUCTS CORPORATION
Dept. 75 • 12621 Burt Rd. • Detroit 23, Michigan

Please send me additional information.

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

Also Produced in
OTHER ALLIED PLANTS

SPECIAL COLD FORGED PARTS

STANDARD CAP SCREWS

PRECISION GROUND PARTS

SHEET METAL DIES MADE OF FERROUS ALLOYS, ZINC ALLOYS OR PLASTICS

tem has been incorporated to maintain the oil level in the hydraulic section.

Advance and retract thrusts are developed by air pressure with single or multiple feed rates and rapid travel movements established by adjustable hydraulic controls. Stroke is adjustable to a full 4 inches.

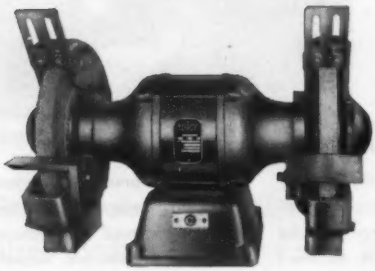
Automatic, semi-automatic or manual cycling, skip drilling, back-feeding, manual jogging and positive stop with dwell operations are claimed to be easily achieved.

The 4-way air control valve can be actuated by the control poppets or by remote air or electric operated valves. Operating on air supply pressures of 50 to 150 psi, the developed thrust equals 8.5 times the input air line pressure. Depth accuracies to .0005" can be maintained by use of positive stop and dwell. Hause Engineering, Dept. BB, Montpelier, Ohio.

Use ACTION Card, opposite page 64. Encircle No. 4

BALDOR GRINDERS

BALL BEARING - TOTALLY ENCLOSED - HEAVY DUTY



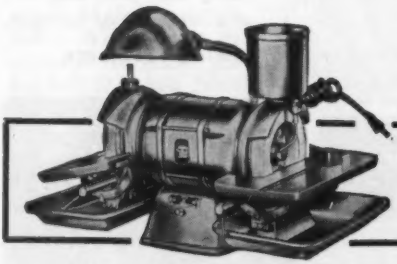
Baldor Grinders are available in bench and pedestal types with 6" to 12" wheels. Baldor Grinders are better because:

More Rugged — Arbor diameter ⅞" and "sealed-for-life" ball bearing Size .05.

More Versatile — Wide clearance between wheels and motor frame permits grinding of large or odd shaped pieces.

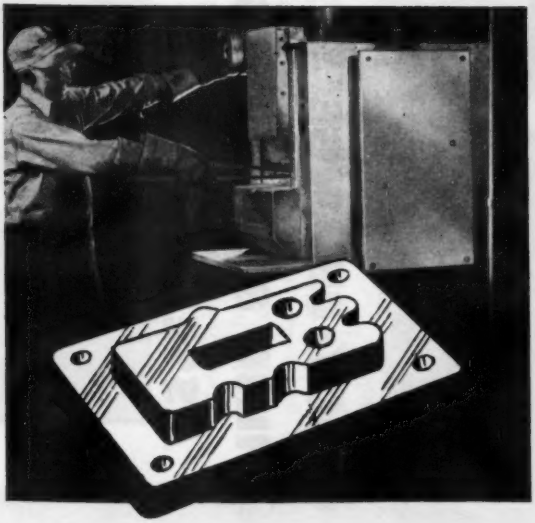
Baldor is a basic manufacturer of grinders—even the motors are built by Baldor.

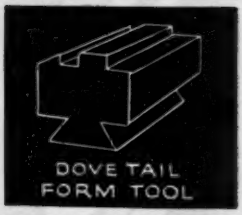
Baldor 10" Series Grinder ¾ h.p., 1 phase, 60 cy., 1725 rpm, 10" wheel. $134.00

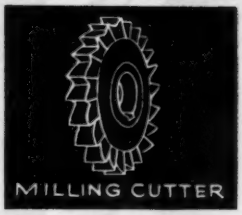


Special Carbide Tool Grinder built especially for sharpening carbide tools quickly and accurately. Reversible ½ h.p., motor withstands repeated overloads. $149.00.

BALDOR ELECTRIC COMPANY
4368 DUNCAN AVE. ST. LOUIS 10, MO.







Is the Right Furnace in *Your* Tool Hardening Picture?

Protection against scale and decarburization during the hardening cycle on high speed steel tools similar to those shown above is definitely assured in Sentry Furnaces employing the Sentry Diamond Block Method of atmospheric control.

Hundreds of manufacturers have proved to their own satisfaction that there is no better means of preventing surface deterioration in heat-treating. Sentry Furnaces do an outstanding job of hardening *all* types of high speed and air hardening steels.

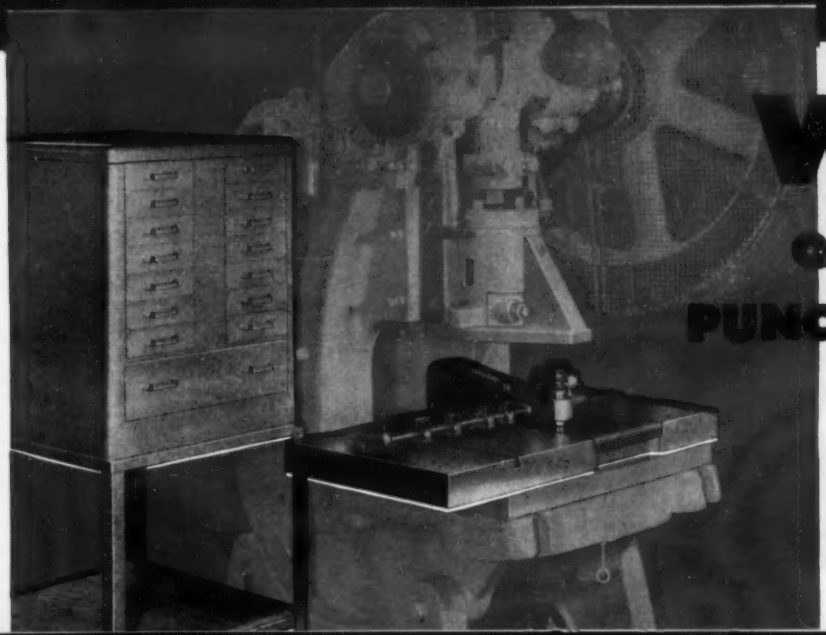
Tools, dies, punches — all tool room items — deserve the best of heat treatment — the Sentry Diamond Block Method. Investigate Sentry Furnaces. Be sure *you* have the right furnace for your tool hardening problem.

Request Catalog T-26 Tells the full story of Sentry Furnaces and The Sentry Diamond Block Method.

Sentry ELECTRIC FURNACES

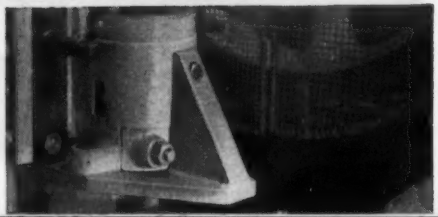
THE SENTRY CO. • FOXBORO • MASS.

Announcing



WALES

QUICK-CHANGE PUNCHING & GAUGING ASSEMBLY



Converts presses into a versatile hole punching machine with **20 SECOND PUNCH AND DIE CHANGE**

● This new, self-contained press accessory pays for itself in a matter of a few months...in some cases in a matter of weeks by such unusual time saving advantages as changing punches and dies in 20 seconds. Holder keeps punch and die in permanent alignment. Built-in adjustable gauging provides a new, simple, fast, accurate method of locating the work.

Popularly known as the Wales "PPG Group", it consists of a bed plate, quick-change holder, 18" back gauge bar, 18" stop support rail and a combination punch storage cabinet and tool rack.

This is too BIG a story to tell in this space, so write for illustrated PPG Bulletin.

WALES-STRIPPIT CORPORATION

George F. Wales, Chairman

396 Payne Avenue, North Tonawanda, N. Y.

(Factories: Buffalo and Niagara Falls)

WALES-STRIPPIT OF CANADA LTD., HAMILTON, ONTARIO

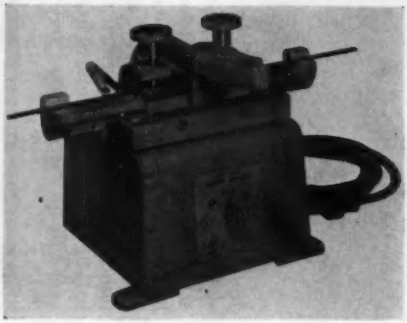
Showing how easily and quickly the punch and die is removed and replaced in the Wales Quick-Change Holder for punching holes up to 1¼" in diameter. To remove the die, pull the holder forward and hit the punch head with hand which releases the ball-held die from bottom of holder. Punch assembly is merely lifted out of top of holder.

Showing Wales 3½" Holder for punching holes up to 3½" in diameter. This holder is not part of the "PPG Group" but is available as optional equipment.

Electric Brazer for Band Saw Blades Holds Back Edge of Blade Against Rail

The Oliver electric brazer, claimed to be a completely new design, utilizes the electric heat of resistance for melting down the soldering metal. There is no open flame; no combustion and formation of scale on the saw blade can take place, the conduction of heat allowing a sensitive control.

The top part or bed consists of a permanently located back rail, clamping plates and clamps fitted to hold the saw ends. Two spring devices hold back edge of blade against the back rail to insure a perfectly straight braze.



Brazing process takes only a few seconds. This factor prevents alterations in the texture of the steel, owing to the air entering the brazed seams and to oxidations, deteriorating its tensile strength. Oliver Machinery Co., 1003 Clancy Ave., N.E., Grand Rapids 2, Mich.

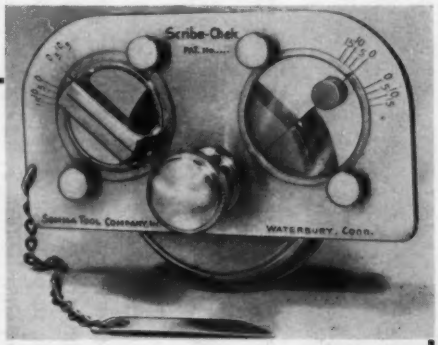
Use ACTION Card, opposite page 64. Encircle No. 5

Scribe-Chek

CUTTING EDGE GAGE . . .

FEATURES

- Simple operation, even inexperienced men can sharpen tools properly.
- Eliminates costly "cut and try" tool Sharpening methods—pays for itself many times over.
- Gives longer tool life and therefore more correct pieces per grind.
- Inexpensive—High Precision Instrument.



SCRIBE-CHEK . . . TAKES THE GUESSWORK OUT OF SHARPENING CIRCULAR FORM TOOLS.

At last . . . a Gage to eliminate your tool sharpening problems. No more trusting the human eye — with the Scribe-Chek gage you can scribe the exact cutting edge required on the tool (with or without top rake) and also visually check the result after sharpening.

West Coast Warehouse: 576 No. Prairie, Hawthorne, California

SOMMA TOOL COMPANY Inc.

Manufacturers of Standard and Special Precision Form Tools

21 BROWN STREET • WATERBURY, CONN.

NOPAK Shelf-Stock Service — based on these 2 Standard Mounting, Class 1, Cushioned Cylinders

MODEL A

MODEL E

Now in its 7th year

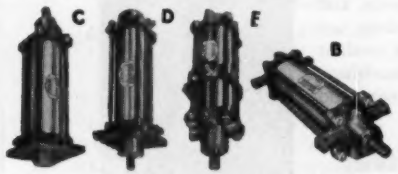
LIST PRICES F.O.B. Milwaukee, Wisconsin (Subject to Revision)

Cyl. Dia. Bore	STOCK STROKE LENGTHS — All Double Acting								
	1"	2"	3"	4"	6"	8"	10"	12"	15"
1½"	24.16	25.72	26.08	26.44	27.16	27.88	28.60	29.32	30.40
2"	26.24	27.88	28.32	28.76	29.64	30.52	31.40	32.28	33.60
2½"	32.36	34.12	34.68	35.24	36.36	37.48	38.60	39.72	41.40
3"	35.04	37.28	37.92	38.56	39.84	41.12	42.40	43.68	45.60
4"	40.84	43.68	44.52	45.36	47.04	48.72	50.40	52.08	54.60
4½"	48.96	51.92	52.88	53.84	55.76	57.68	59.60	61.52	64.40
6"	66.60	70.80	72.20	73.60	76.40	79.20	82.00	84.80	89.00
8"	———	126.80	129.20	131.60	136.40	141.20	146.00	150.80	158.00

By specifying NOPAK Shelf-stock, you buy *quality cylinders* at lowest prevailing prices, you *eliminate waiting* for "specials", reduce engineering costs. Compare the prices and scope of NOPAK Shelf-stock (1½ x 1" to 8 to 15") with competitive offerings — and you *will specify* NOPAK.

- Basic mountings "A" or "E" convertible to "B", "C", "D" or "F", (see below) by changing cylinder heads. Add 10% to above prices, (no extra charge 8" bore).
- Piston Rods NF male thread.
- Cushioning can be eliminated on rod, blank or both ends by removing spring and ball-check.

NOPAK 4-Way Valves, hand, foot, solenoid, or pilot operated, to actuate all cylinders, *also in Shelf-stock.*



GALLAND-HENNING NOPAK
2754 South 31st Street, Milwaukee 46, Wisconsin

Representatives in Principal Cities

NOPAK
VALVES AND CYLINDERS
DESIGNED for AIR and HYDRAULIC SERVICE

NOTE: Cylinders listed above may be used for ***AIR*** or ***OIL*** to 250 psi. Water use requires 1 week delivery for chrome plating of steel components.

A 8003-½-IAR

Power groover closes both single and Pittsburgh lock seams

With interchangeable horns and rolls, the Niagara universal power groover (Model 48-U) is claimed to be the first machine built for closing both single lock seams and Pittsburgh lock seams.

Power driven, it is designed to reduce operator fatigue while eliminating the noise, delays and uncertainties of hand tools. Convenient controls provide fast, smooth operation.

With a nominal working length of 48", the groover is equipped with adjustable stops to hold work stationary on the horn. Rolls are mounted in swinging cradles to permit front roll engagement on outstroke and rear roll engagement on return. Adjusting wheels enable close regulation of roll pressure to conform with thickness of material.

The single lock seaming horn can be

The coolant stinks, eh?

Well, don't dump it!

We'll kill that odor with the new powder-additive: **Rance-RID**

IT'S A SERIOUS COST-PROBLEM:

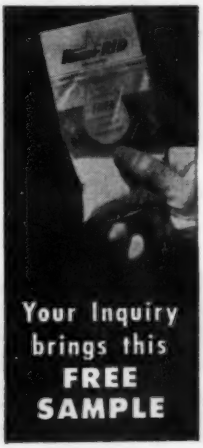
Metalworking plants are pouring coolant and labor dollars down the drain. The reason: coolant turns rancid.

RANCE-RID SOLVES THE PROBLEM:

It restores *the original condition* of the oil emulsion. It smells, looks, and *is* like new. No masking odors are used . . . Use it in central-type coolant systems, or in individual machines. Treat the same coolant over and over again!

TRY RANCE-RID—AT OUR EXPENSE:

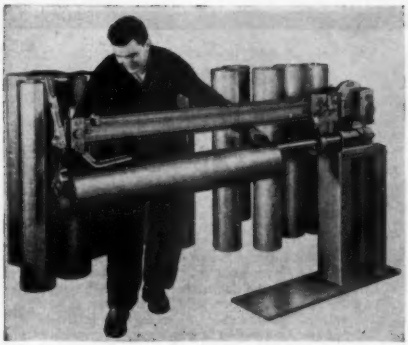
That sounds generous. Actually, it isn't. Rance-Rid sales have been built on *one-ounce samples. Just one ounce treats 20 gallons* of soluble oil emulsion . . . Try it—at no cost. Your inquiry brings the sample.



Your Inquiry brings this **FREE SAMPLE**

HERSEN CHEMICAL CO.

825-O FISHER BLDG., DETROIT 2, MICH.



rotated and locked in any one of three positions for grooving inside seams or turned to flat side for grooving outside seams. Widths of grooves in the rolls and horn for single lock seaming are ⅜", ½" and ⅝" while the horn for Pittsburgh lock seaming has a 7/16" groove width. Niagara Machine & Tool Works, 637 Northland Ave., Buffalo 11, N.Y.

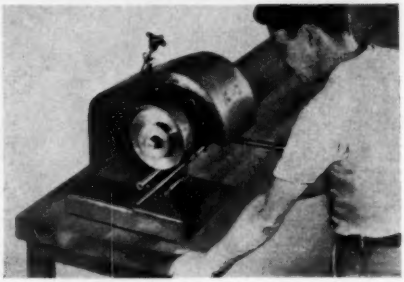
Use ACTION Card, opposite page 64. Encircle No. 6

Bench type cut-off machine

Production cutting of up to 1000 pieces of 1¼" od pipe per hour is claimed for a bench type pipe and tube cut-off machine manufactured by Continental Machine Co., 1952 Maud Ave., Chicago 14.

It cuts all sizes from ⅜" od to 1¼" od pipe and tubes, from light gauge to 12-gauge wall thicknesses. Drive is by a ¼ hp gear headed motor. Cord connects to 115 volt ac outlet. Tempered cutting wheel is 7" diameter.

Use ACTION Card, opposite page 64. Encircle No. 7



16" & 22" WOTAN HIGH SPEED PRECISION SHAPERS

FOR TOOLROOM & PRODUCTION WORK

CONVENIENT TO USE

Equipped with V-Ram

Automatic Pressure Lubrication

(incl. Ram Ways)

Cutting Speed Indicator

V-Belt Motor Drive

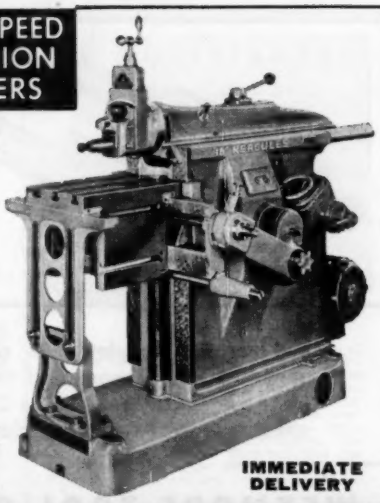
22" SHAPER: 8 Speeds - 12-132 Strokes per Min.

16" SHAPER: 6 Speeds - 26-152 Strokes per Min.

SPECIAL EQUIPMENT AVAILABLE

Tilting Clamping Plate—Universal Table—Power Down-Feed to Toolhead—Automatic Tool Lifter.

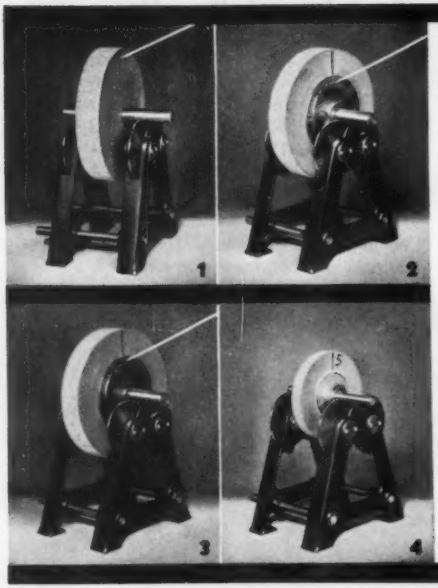
For Full Details Write, Wire or Phone:



IMMEDIATE DELIVERY

PARKER MACHINE COMPANY, INC.

158 PIONEER STREET · BROOKLYN 31, N. Y. · TEL. TRiangle 5-2103 & 2157

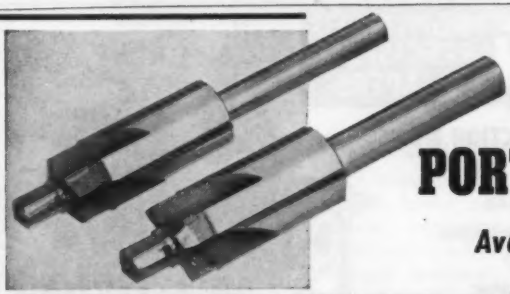


QUICK, EASY WAY TO BRING GRINDING, BUFFING, AND POLISHING WHEELS INTO BALANCE . . .

(1) Balance on Anderson super-sensitive Balancing Way and mark light side. (2) Line up mark with both zeros on Anderson Speedi-Balancer. (3) Turn both discs till wheel balances. (4) Record setting. Wheel is now prebalanced for instant use when needed: just use Speedi Balancer, set to number marked, as outside collar. Save time. Eliminate weights. Reduce vibration. Increase motor bearing life. Improve motor performance. For information on sizes, types, and prices of Anderson Balancing Ways and Speedi-Balancers, write for Bulletin 11-5.

ANDERSON BROS. MFG. CO.

ROCKFORD, ILLINOIS



NOW...

PORTING TOOLS

Available from Stock

AND-10050

Send for valuable data sheet

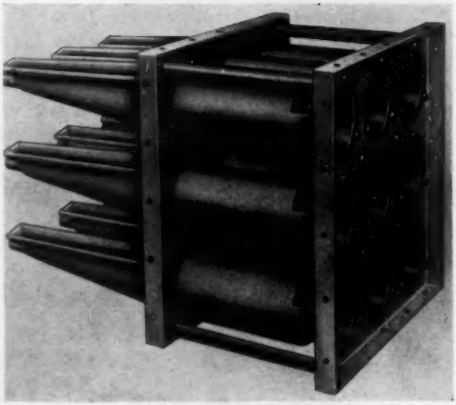
A complete line of carbide tipped combination ream, counterbore and facing tools to form AND-10050 standards. Tube sizes 2 through 24 in turret lathe and drill press types. Special tools made to order.

WETMORE TOOL & ENGINEERING CO.

Engineers **Designers** **Manufacturers**

5318 E. Washington Blvd., Los Angeles 22, Calif. AN 9-7266

Compact granular dust collector



An outside-in twist that reverses the normal tangential flow of most centrifugal dust collectors is claimed to give the compact Amerclone dry granular dust collector high efficiency over a wide range of air volumes.

The Dust Control Division, American Air Filter Co., 215 Central Ave., Louisville, Ky., manufacturer, says the heart of the development is a conical inlet which imparts a swirling motion to dust particles, while permitting clean air to travel through the Type G Amerclone tube without changing direction. Each tube has an approach velocity of 1000 fpm and a cleaning capacity of 333 fpm.

Nine Amerclone tubes are combined in a standard modular cell, which has a nominal rating of 3000 cfm with a face area only 20" by 20". Any number of the modular cells may be combined

INDEXING TURNTABLES AND POSITIONERS

CAMS

Eisler makes over 100 different types of indexing mechanisms for spraying, glass insulators, melting and glass glazing with rotating stations and motorized or hand operated. Rotating tables of all kinds for over 35 years. We supply any part or complete equipment and we make special turntables and cams to your specifications. You are invited to see our showroom and see for yourself our many models on display. Write or call for our new catalog No. 88-55.

DR. CHAS. EISLER M. E., PRES.
EISLER ENGINEERING CO., INC., 762 So. 13th Street, Newark, N. J.

to achieve required capacity within available space.

Because of this simplified air flow design, the units can handle widely fluctuating air volumes and dust concentrations.

Use ACTION Card, opposite page 64. Encircle No. 8

Spring-making machine

The W-10A Springmaker product of the Torrington Mfg. Co., Dept. B, Torrington, Conn., is a complete redesign of the W-10.

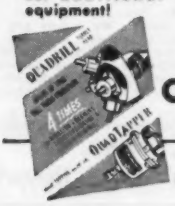
Improved operation, said to result in reduced maintenance requirements and greater production capacity, more convenient placement of controls and provision for mounting additional mechanisms on the face of the machine's front housing are improvements in the new model.

The W-10A can handle .008" to .028"

one drill press
does the work of FOUR

Send NOW for additional information on how YOU can increase YOUR production without additional equipment!

Drill — ream — countersink and counterbore, all on one drill press without setting up for each operation. A simple rotation of this turret head brings any one of four drills or cutting tools into position. Accurate — fast — economical! Try Quadrill — it will earn you more profit thru less production cost.



CHICAGO QUADRILL
Company

1846 BUSSE HIGHWAY, DESPLAINES, ILLINOIS

Acme-Gridley 5/16" automatic screw machine in REPUBLIC AVIATION CORP. plant, Farmingdale, Long Island... showing UNISORB mounting pads under machine base. No costly floor drilling to install this machine.

AT AN AVERAGE COST OF LESS THAN $10.00 YOU CAN REDUCE VIBRATION, INSTALL MACHINES SECURELY ON

UNISORB® MOUNTING PADS

Your first saving when using UNISORB is in the cost of the mounting pads, an average of less than $10.00 per machine. And savings in first cost are only the start. You also save 10% to 30% in time and labor for installation, because with UNISORB you do not have to drill floors . . . or patch floors when you move machines. Transmitted machine vibration is reduced up to 85%.

"FACTS ABOUT ANCHORING YOUR MACHINES ON UNISORB" gives you complete information about this modern machine installation method. Just return the coupon for your copy.

Look for the red center and **UNISORB** brand mark

The **FELTERS** Co.

219 SOUTH STREET, BOSTON 11, MASS.

"FELT FOR EVERY USE"

Offices: New York, Philadelphia, Chicago, Detroit, St. Louis
Sales Representative: San Francisco
Mills: Johnson City, New York; Millbury, Mass.; Jackson, Mich.; New York City

RETURN COUPON NOW! Please send me a copy of FACTS ABOUT ANCHORING YOUR MACHINES ON UNISORB, at no obligation to me.

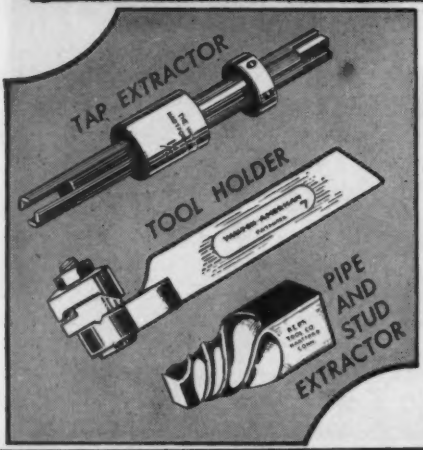
Name..... Address.....

Title..... City..... Zone....

Company..... State.....

Return to The Felters Co., 219 South St., Boston 11, Mass.

WALTON *SPECIALIZED* TOOLS CUT COSTS IN METAL WORKING



SAVE TIME AND LABOR

When the broken pieces of taps, screws, studs, and pipes resist all ordinary methods of removal, **Walton Specialized Extractor Tools** will greatly aid you in keeping production moving. Especially designed for this job, these tools reduce excessive costs through savings in labor and parts salvaged. **Always have them at hand in your tool crib.**

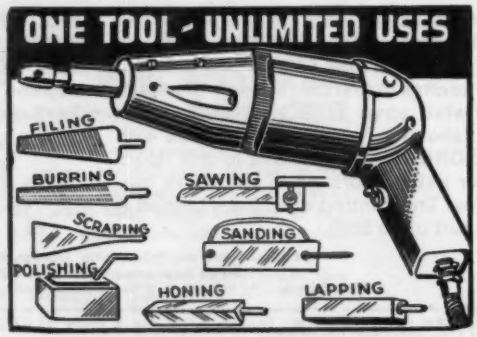
Walton-American Tool Holders are also "labor savers." Four sizes will handle all tool bits and boring bars from 1/8" to 7/16", each size adjustable to eight straight, right offset, or left offset positions. **Try a set in your shop at our expense.**

Write for Walton Tools Catalog No. 12. Liberal free trial offer on all tools. Sold by leading industrial supply dealers.

THE WALTON COMPANY, Hartford 10, Conn.

STOP... HAND WORK

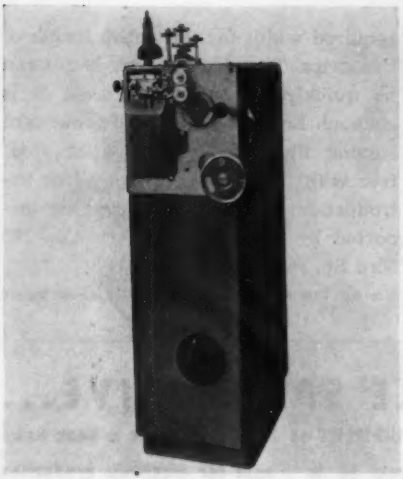
Use these Handy PORTABLE ELECTRIC RECIPROCATING TOOLS for Greater Production, Better, More Uniform Work — All with less Operator Fatigue. Fixed strokes are 1/8" or 3/8" long. Operate on 110 volts AC-DC. Deliver 1000 PUSH-PULL strokes per minute.



Try one of these tools on your next job

ACME TOOL COMPANY

71 WEST BROADWAY **NEW YORK 7, N. Y.**



wire ranging up to 24" in length. Outside diameter of the machine's coils range from 1/16" to ⅜". Extra wire feed gears permit the handling of up to 36" lengths of .008 to .024" wire and up to 48" lengths of .008 to .020" wire.

From 24 to 243 springs per minute can be produced with a motorized variable speed transmission and from 21 to 240 with an electronic adjustable speed drive, the manufacturer claims.

Use ACTION Card, opposite page 64. Encircle No. 9

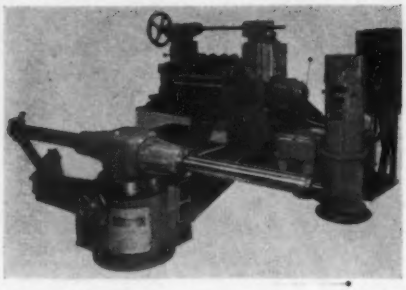
Rotary gang slitting shears

The Weybridge rotary gang slitting shears give a cutting speed of up to 200 ft. per min.

Although usually employed for shearing flat or coiled metals, they also can be used for mica, friction brake linings, brass and steel gauze, celluloid, as well as silicon iron electrical sheet.

Hub type cutters are capable of being set to almost zero clearances without fear of damage to their cutting edges. Lateral movement of the cutter shaft is eliminated by the use of pairs of preloaded taper roller bearings at the driving end. The resultant strips produced by the machine are within .002" of their

SPECIFY KASSON PRECISION COLLETS AND ATTACHMENTS
IMMEDIATE DELIVERY FROM STOCK
3AT, 3C 1A, 4C 5C
KLUTCH-KOLLET
Step collet for accurate chucking to 2¾" dia. Soft head for easy boring. Lowest price on market! Models 3AT, 3C, 5C.
480 • (AC-50)
All collets in hexagon, square and round.
FOR ATLAS • LOGAN • SOUTH BEND CRAFTSMAN • SHELDON LATHES, ETC.
LEVER-TYPE DRAWBAR ½" cap.
Positive grip on undersize, oversize or standard diameter work! Patented coordinate cams eliminate fingers.
Let us quote on your quantity orders for any type of collet, live center or other machine tool attachment!
HAND DRAWBAR ½" cap.
LIVE CENTER (Ball Bearing) Double sealed for accuracy.
KASSON
Precision
KASSON Precision products are guaranteed unconditionally for accuracy, fit and long life. Your dealer should have them . . . Write us for literature!
KASSON DIE AND MOTOR CORP.
32-14 Northern Boulevard
LONG ISLAND CITY 1, N Y
Integrity Since 1919



required width for the entire length of the strips. The whole cutter setup can be quickly removed and reset, it is claimed. Entire tail unit slides outward leaving the ends of the cutter shaft free with clearance for removal or introduction of cutters. Machines are imported by S & S Machinery Co., 133 53rd St., Brooklyn 32, N.Y.

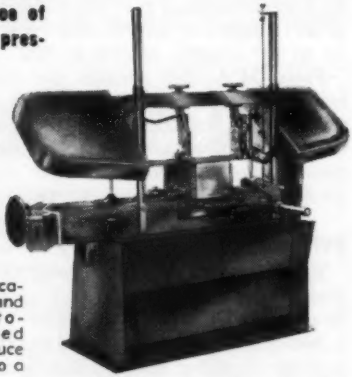
Use ACTION Card, opposite page 64. Encircle No. 10

VARIABLE SPEED DRIVE...

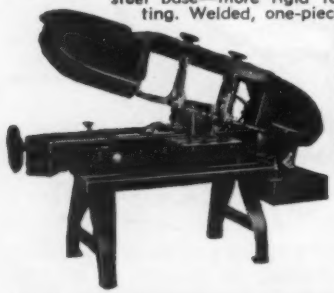
new STANDARD EQUIPMENT on ALL W. F. Wells & Sons Saws

Provides speeds from 50 to 290 f.p.m. Combined with a graduated metering valve on our fully hydraulic models, this feature permits choice of proper blade speed and pressure for maximum production and blade life from high speed or high carbon steel blades.

2 new models with full hydraulic operation—MODELS W and F →



MODELS W and F—9"x18" and 14"x18" capacity, respectively, feature full hydraulic operation. All welded steel base—more rigid for heavier cutting. Welded, one-piece cutting head for swifter blade changes and easier chip removal. Larger capacity coolant and chip tray. Automatic bar feed available to reduce operator's time to a minimum.



AUTOMATIC BAR FEEDS ARE AVAILABLE FOR BOTH MODELS

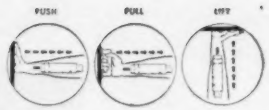
MODEL H — the economy, hinge-type model in our line. 9" x 16" capacity. One-piece welded frame lowers hydraulically. Pressure easily adjusted for proper cutting. Special precision guides give longer blade life.

We also make . . .

- **Automatic bar feeds for duplicate cutting.**
- **Stock stands for positive alignment of stock.**
- **Coolant systems for wet cutting, and other accessories.**
- **Custom-built machines for special applications.**

W. F. WELLS & SONS

THREE RIVERS, MICH.



Rx for . . .

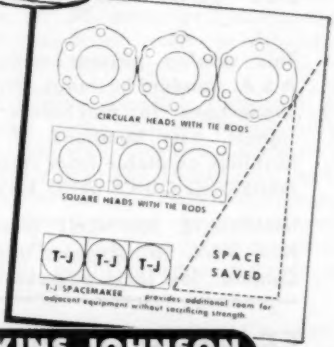
AUTOMATION

OFF SHELF DELIVERY!

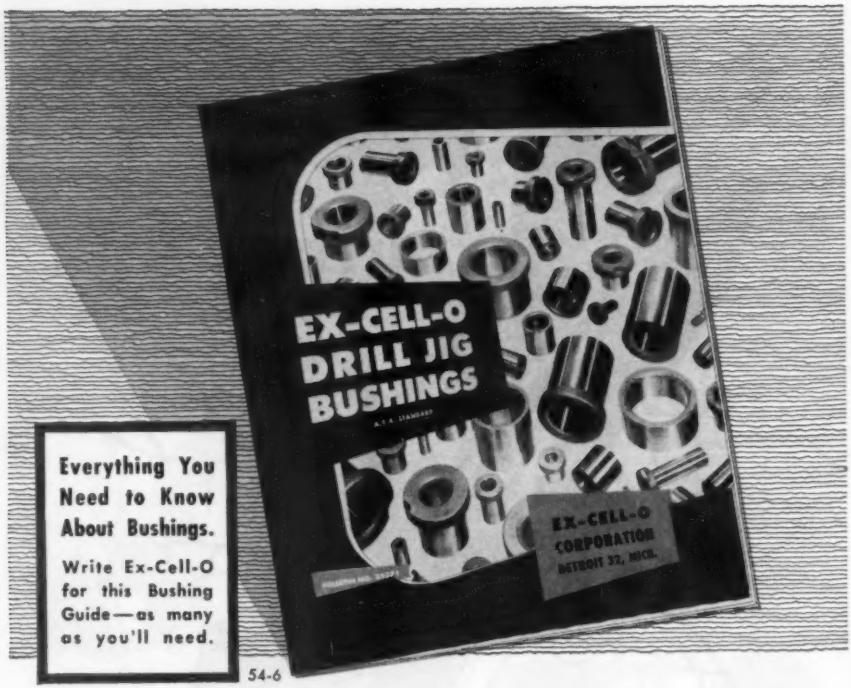
T-J Spacemaker CYLINDERS

★ OIL pressure to 750—AIR to 200 P.S.I.
★ New Compact Design . . . Saves up to 40% Space
★ Proven Performance . . . with Extra High Safety Factor
★ Super Cushion Flexible Seals for Air . . . New Self-Aligning Adjustable Oil Cushion
★ Hard Chrome Plated Bodies and Piston Rods

Compare feature by feature—you'll see why T-J Spacemaker Cylinders are today's top choice for streamlined power movement in automation! The only cylinder with all the extras as standard. Write for bulletin SM-454-2. The Tomkins-Johnson Co., Jackson, Mich.



T-J TOMKINS-JOHNSON
RIVETORS AIR AND HYDRAULIC CYLINDERS CUTTERS CLINCHORS



Everything You Need to Know About Bushings.

Write Ex-Cell-O for this Bushing Guide—as many as you'll need.

54-6

A Complete Bushing Guide

for your Engineering and Purchasing Files

This catalog pictures and describes A.S.A. standard bushings. Gives helpful suggestions to purchasers and designers, lists hundreds of Ex-Cell-O bushings available from stock. MAKES ORDERING QUICK AND EASY.

IMMEDIATE SHIPMENT from Detroit, New York, Los Angeles and London, Canada. See local addresses at right.

EX-CELL-O CORPORATION

DETROIT 32, MICHIGAN

LOCAL ADDRESSES

EX-CELL-O CORPORATION

1200 Oakman Blvd., Detroit 32, Michigan
53 Park Place, New York 7, N. Y.
1500 W. Slauson Ave., Los Angeles 47, Cal.

In Canada—Ex-Cell-O Corporation of Canada, Ltd., 120 Weston St., London, Ontario.

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLES • CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

Literature

CATALOGS AND BULLETINS AVAILABLE FROM MANUFACTURERS

For copies of the literature in which you have an interest use the postage-paid postcard on the next page. Merely cricle the identifying number and mail the postcard.

1. Vertical Milling Machine. Four page folder describes features of Crowningshield Model VM-1 Vertical Milling Machine made by Crowningshield-Harris Co., Dept. BB, Greenfield, Mass. Folder includes general specifications for the machine and specifications of milling attachments.

2. Lathe Service Manual and Parts List issued by Cincinnati Lathe & Tool Co., Dept. MB, Cincinnati 9, Ohio, includes description, special service tools, operation, inspection and lubrication, maintenance and parts. 64-page manual contains sketches, pictures and general specifications.

3. Flexible Shaft Machine Catalog. Franklin Balmar Corp., N.A. Strand Div., Dept. B, 5200 Clipper Rd., Woodberry, Baltimore 11, Md., has issued a new catalog covering complete line of Strand Flexible Shaft Machines and accessories. It presents three basic types of machines; single speed direct drive, multiple speed countershaft drive, and multiple speed gear-drive Strandflex drive. Also useful tables relating to grinding wheels and operating speeds are included.

4. Carbide Dies. New brochure offered by Champion Tool & Die Co., Dept. BB, McKeesport, Pa., is entitled "Reduce Die Costs on Hexagon Recessed Screws with Champion Carbide Dies." Four-page brochure includes illustrations and construction features.

5. Steel Cutting Carbides. A new catalog covering latest prices and specifications on standard tools and blanks in its 300 series steel cutting carbides—grades 350 and 370—is available from Carboloy Department, General Electric Co., Dept. MTB, Detroit 32, Mich. Sixteen-page catalog, GT-305, includes all blanks and shapes introduced since the development of the series a year ago.

6. Molybdenum Disulfide Lubricant. A four-page folder entitled "Fringe Area Lubrication with Molykote Lubricants" is available from The Alpha Corp., Dept. BB, 65 Harvard Ave., Stamford, Conn. Folder describes new concepts of extreme pressure or boundary lubrication in which solid lubricants perform a major function.

7. Cutting Tools. Putnam Tool Co., Dept. MB, 2981 Charlevoix Ave., Detroit 7, Mich., offers a new catalog covering

line of standard Putnam cutting tools. Catalog No. 55, contains 112 pages illustrating in two colors each type of manufactured tool and provides complete price and specification information on end mills, reamers, counterbores, holders and other products. Over 1,400 types of end mills are shown.

8. Precision Face Grinders. A 20-page bulletin illustrating and describing a new concept in precision face grinders is available from the Besly-Welles Corp., 128 Dearborn Ave., Beloit, Wis. Diagrams and performance data show how this type of grinder increases production by using two work stations and automatically indexing the grinding head over each of them on alternate grinding cycles.

9. Selection Guide. Ajax Flexible Coupling Co. Inc., Dept. BB, Westfield, N.Y., offers a new handy, pocket-size selection guide containing technical data, ratings, drawings, specifications, service factors and general information on the uses of Ajax rubber-bronze bushed flexible couplings.

10. Tool Room Wheels. The Carborundum Co., Dept. MB, Niagara Falls, N.Y., has issued a brochure entitled "V40 for Tool Room Grinding" which describes a complete line of tool room wheels and lists hints for conservation of tools. Included is a handy tool room chart with recommendations for grinding high speed tool and die steels.

11. Carbide Tipped Tools. A new 24-page book on carbide tipped tools, containing helpful information on their use and care, has been issued by the Cleveland Twist Drill Co., Dept. BB, 1242 E. 49th St., Cleveland 14, O. Book gives brief data on recommended speeds and feeds for carbide tipped drills and reamers, and also offers illustrated instructions for regrinding both types.

12. Screw Machine Services. Biddle Screw Products Co., Dept. B-290, Sheridan, Ind., describes their facilities devoted to production of screw machine products, processes and equipment in a new 8-page brochure.

13. Aluminum Chart. Peter A. Frasse and Co., Dept. BB, 17 Grand St., New York 13, N.Y., has completed a new chart that fully describes the new Aluminum Designation System developed by the Aluminum Association. Chart includes old and new designations for easy conversion and describes in detail the workings of the new four digit index system.

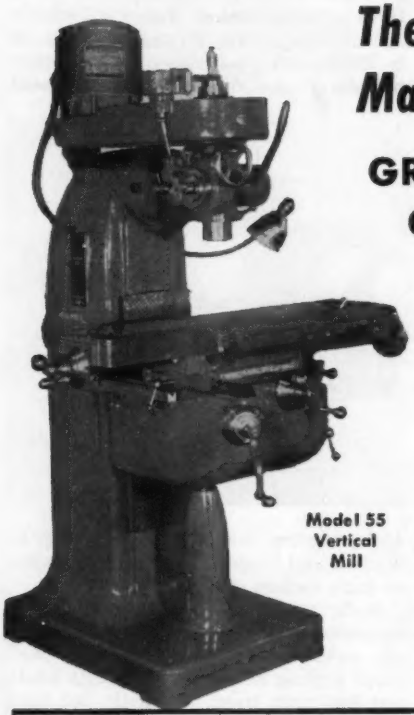
14. Threading Heads. Bulletin No. F-90-2 from Landis Machine Co., Dept. MTB, 54 S. Church St., Waynesboro, Pa., describes heat treated threading heads. It also includes detailed data on all Landis threading heads, both standard and special. All die heads are illustrated and complete specifications are provided.

15. Engineers Master Chart for Center Hole Design. Due to recent changes in center drill standards as setup by the center drill manufacturers, The Ready Tool Co., 550-B Iranistan Ave., Bridgeport 5, Conn., has re-issued the master chart, conforming to the new numbering system. This new sizing method has reduced the number of drills necessary and simplified the coding of sizes greatly.

16. Air Motors and Valves. Bulletin SP-50 from the Bellows Co., 222 West Market St., Akron, Ohio, illustrates and describes the dimensions and specifications of Bellows Air Motors and Valves. This 28-page book includes 75 illustrations and 27 specification charts.

17. Deep Drawing Hydraulic Presses. The M & N Hydraulic Press Co., Dept. BB, 780 Route 3, Clifton, N.J., has pre-

Choose INDEX MILLS



Model 55
Vertical
Mill

The Improved Low-Cost Machines that give you

GREATER VERSATILITY!
GREATER ECONOMY!
EXTRA CAPACITY!

You get more when you buy an Index Mill —more quality, superior features. You are not just buying a machine . . . You are investing in equipment that will deliver better results at lower cost. The ideal machines for all your

MILLING, BORING *and* DRILLING JOBS

Outstanding in this great line is this versatile MODEL 55 VERTICAL MILL, designed for those extra capacity jobs often found in tool and die shops; provides increased speed and feed range. Capacity ⅛" to 1½" end mills in steel, a table working surface of 32" x 9" or 38" x 9"; overall 40" x 9" or 46" x 9".

MODEL 40 VERTICAL MILL

For speedy, economical milling. Spindle gives 9 speeds, 125 RPM to 2250 RPM. Easy to operate. Rugged, for every day operation; also used for boring and locating. Capacity ⅛" to 1" end mills in tool steel. Table working surface 8" x 26", 8" x 34" overall.

MODEL 60 HORIZONTAL MILL

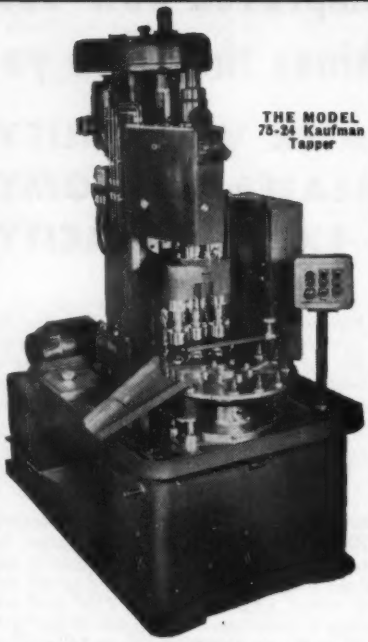
Simple, efficient, compact, with all operating parts enclosed, yet readily accessible. Unusually low-priced. Designed for the average tool room, yet highly suitable for production shops through its rigidity and low maintenance cost. Standard table 40" x 9", larger table optional.

INDEX BUILDS BETTER MILLS . . . WRITE FOR LITERATURE

INDEX MACHINE CO.

540 N. MECHANIC STREET JACKSON, MICHIGAN

KAUFMAN TAPPING MACHINES



THE MODEL 75-24 Kaufman Tapper

Built For Specific Production Jobs

- Single or Multiple Operations
- Precision Depth Control
- Non-reversing Motor Drives
- Pressure Lubricated Lead Screws
- Fast, Accurate, Rugged Index
- Other Head Units Available

And Many Other Worthwhile Features

Send prints and samples of your work for further information and recommendations on how Kaufman Tapping Machines can reduce your production costs.

Catalogs Number 754 and 1153 Mailed on Request

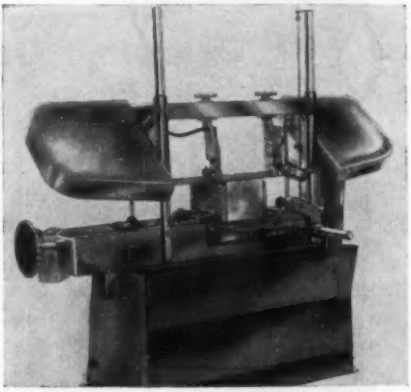
KAUFMAN MFG. CO.

545 SOUTH 29TH STREET

MANITOWOC, WISCONSIN

Metal cutting band saws have variable speed drives

Two metal cutting band saws manufactured by W. F. Wells & Sons, North on 131 (B), Three Rivers, Mich., are identified as Model W (capacity 9" x 18") and Model F (capacity 14" x 18"). Both are equipped with a new variable speed drive, providing speeds from 50 to 290 fpm. A graduated metering valve permits choice of proper blade speed



and pressure, insuring maximum production and longer life from high speed or high carbon steel blades.

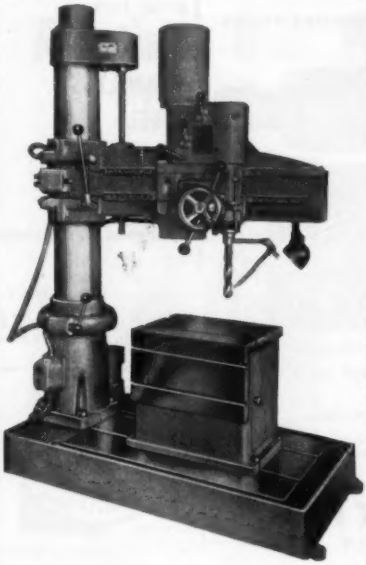
Both saws provide full hydraulic operation and the following features: all welded steel bases; welded one-piece cutting head; large capacity coolant and chip tray; automatic bar feed (optional equipment).

Use ACTION Card, opposite page 64. Encircle No. 11

Air actuated bar folder

Air actuated adjustable bar folders, used for bending or folding sheet metal to an angle or lock, feature a foot-operated valve which controls the flow of air to the actuating cylinder.

Initial movement of the piston automatically clamps the work in place while the folding blade rotates. Release of the pedal instantly reverses the ac-



ARBOGA

(SWEDISH MADE)

RADIAL DRILLS

Bench and Floor Type

Geared Head

DRILL PRESSES

Arboga machines embody all the traditional workmanship of Swedish Machine Tools. *Very favorably priced.*

Many machines in plants all over the United States, where they are very popular and well accepted.

RADIAL DRILLS available in sizes of 24", 28", and 40".

DRILL PRESSES available in many different models, with accessories that will allow vertical milling.

Please call or write to the following dealers in your territory:

All American Machine Corp.
45 Crosby Street
New York 12, N. Y.
Tel. WAlker 5-8300

Joseph Beal & Company
87 Binney Street
Cambridge 42, Mass.
Tel. UNiversity 4-2813

Ralph Hochman & Company
52 Edison Place
Newark 2, N. J.
Tel. Mitchell 3-8430

Hochman Machinery Company
119 North Third Street
Philadelphia 6, Pa.
Tel. MArket 7-6233

Star Machinery Company
241 Lander Street
Seattle 4, Wash.
Tel. Elliot 0760

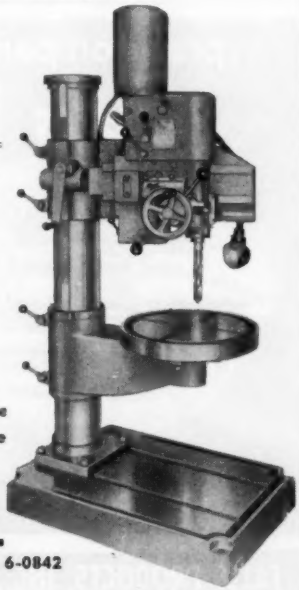
Steel City Tool & Machinery Co.
3045 West Liberty Avenue
Pittsburgh 16, Pa.
Tel. LOcust 1-4011

Masters Precision Tools
3613 Archer Avenue
Chicago 9, Ill.
Tel. CLiffside 4-7011

with additional sales outlets in:
River Grove, Ill.
Cincinnati, Cleveland, Toledo, and Springfield, Ohio
Centerline and Grand Rapids, Mich.
Mishawaka, Ind.
St. Louis, Mo.
Tulsa, Okla.
Racine and Milwaukee, Wis.
Minneapolis, Minn.

W. F. Wolf Machinery Co.
2910 Santa Fe Avenue
Los Angeles 58, Calif.
Tel. Logan 3321

Inquiries from dealers outside above territories invited, these should be sent to:



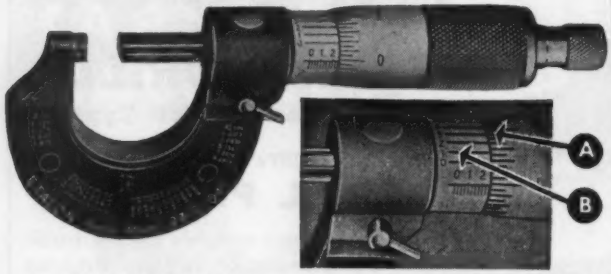
ERNEST GOTTSCHALK CO., Inc.

401 BROADWAY • NEW YORK 13, N. Y. • TEL. WORTH 6-0842

Manufacturer's exclusive U. S. Representatives

E T A L O N 2 3 c

The Only Micrometer Graduated in Thousandths And Half-Thousandths Of An Inch



A. Half-thousandths graduations on thimble allow tenths readings with only 5 Vernier graduations.
B. Deep, machine divided graduations on both thimble and barrel assure easy reading under most lighting conditions.
Forged Frame.
Heavy Duty Tungsten Carbide measuring faces, optically lapped.
Quick acting positive lock.
Feather touch friction stop eliminates wear, assures sensitive "feel".
Dull chrome finish on thimble and barrel eliminates glare.

ASK YOUR DEALER or write:

ALINA CORPORATION
401 BROADWAY, NEW YORK 13, N.Y.

Reads to .0001 of an inch

ONE PIECE— STAINLESS STEEL SPINDLE and SCREW

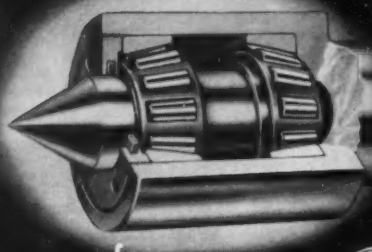
Hardened and ground from the solid.

STILL ONLY
F. O. B. New York **$18.75**

ETALON PROCH ROLLE Suisse

...precision performance-ALWAYS!

Falls ROTO CENTER



Accurate, low cost turning on tough continuous-run work. Preloaded, matched roller bearings assure rigid set-up. Precision ground shank. Heavy-duty grease seal. Many exclusive features.

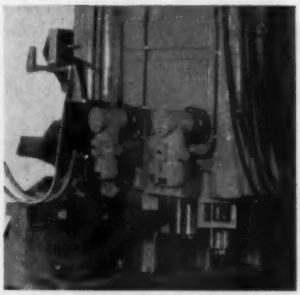
for lathe and grinder tail stocks

PRODUCTS Falls INCORPORATED

FREE BULLETIN 105
"What you should know about LIVE CENTERS"

FALLS PRODUCTS, INC., 122 Genoa Street, GENOA, ILL., U.S.A.

Another Use For The FEN Automatic Wrench —



Illustrated above are two Model 8M Fen Automatic Wrenches operating quills on a Motch and Merryweather Heavy Duty Tank Milling Machine.

For detailed information regarding the application of the Fen Automatic Wrench to your machines, phone, wire or write.

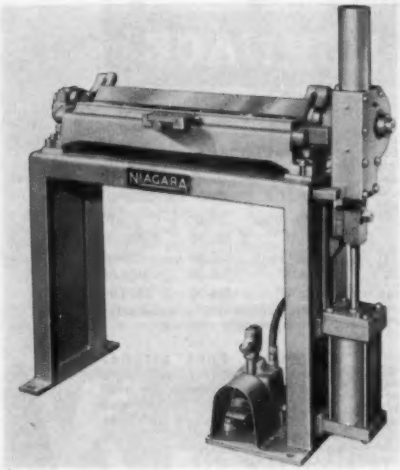
The Fen Automatic Wrenches are being used to move and position quills on heavy duty milling machines. These wrenches are built with a dual torque range; thereby enabling the quill to be moved vertically upward with the higher torque and with the lower torque the quill can be lowered gently to a stop.

THE

FEN MACHINE COMPANY

28915 Lakeland Boulevard

Wickliffe, Ohio



tion. An adjustable stop limits the bend to the desired angle. The width of the fold is controlled by an easily regulated gage.

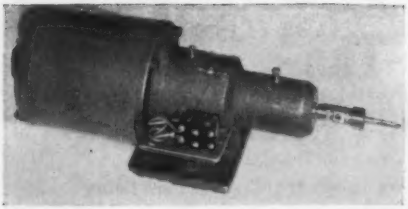
Folders are available in four sizes to handle working lengths from 21" to 42" and thicknesses of 20 gauge, mild steel and lighter. Niagara Machine & Tool Works, 637 Northland Ave., Buffalo 11, N.Y.

Use ACTION Card, opposite page 64. Encircle No. 12

Tapping head produces class 4 threads

Class 4 threads can be produced in open or blind-hole tapping with a motor driven tapping head which has a 10 tooth automotive spline connecting the motor to the tapping spindle.

The Dinabrake motor has a brake winding which eliminates the need for a magnetic brake for stopping rotation at the end of the tapping cycle. A hardened and ground lead screw prevents chamfering of the threads at the start of the tapping and also insures a uniform thread throughout, it is claimed. The lead screw is removable

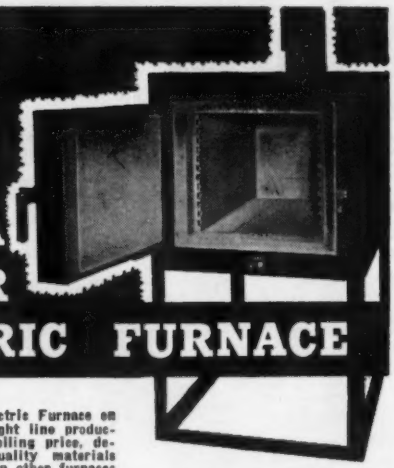


for replacement with pitch lead screw required.

When operator pushes the start button the built-in limit switches produce the forward and reverse movement of the tap automatically. Motor is capable of 30 reversals per minute. Threading capacity of the unit is 0-80 to ⅜". Made by the Simplex Tool Engineering Co., Dept. BB, 2540 Park Ave., Detroit 1, Mich.

Use ACTION Card, opposite page 64. Encircle No. 13

SAVE 3 WAYS WITH A LUCIFER ELECTRIC FURNACE



1 SAVE with a Lucifer Electric Furnace on FIRST COST. Our straight line production permits economical selling price, despite use of highest quality materials throughout. Check costs on other furnaces . . . feature by feature . . . you'll save money on the Lucifer Electric Furnace EVERY TIME.

2 SAVE ON MAN HOURS with a Lucifer Electric Furnace. Less operator attention needed - Lucifer controls are EXACT. They reach SPECIFIED heat rapidly and retain SPECIFIED temperature without variation. No special experience required when you use a Lucifer Furnace.

3 SAVE on maintenance expense with a Lucifer Electric Furnace. Finest refractory materials are built into Lucifer Furnaces for better, more efficient heat retention. Elements are guaranteed, long lived, trouble free. More than two thousand satisfied users.

CHECK THESE PRICES

Furnace Size	2000°	2300°
6x6x12"	$ 500.00	$ 600.00
9x9x18"	750.00	850.00
12x12x24"	1000.00	1100.00
18x18x36"	1500.00	1600.00

Complete with 100% automatic electronic controls.

WRITE FOR FREE LITERATURE, specifications and price list of Lucifer Furnaces in wide range of sizes—top loading and side loading types. Engineering advice without obligation. Write, wire or phone today.

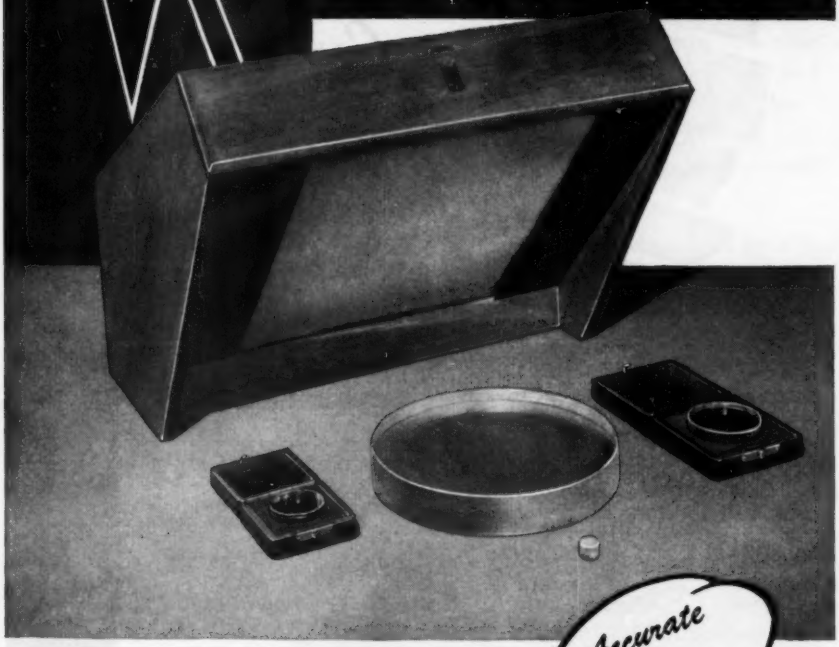
LUCIFER FURNACES, INC.

Neshaminy I, Pa. **Phone Osborne 5-0411**

Successors to Gilbert S. Simonski Company

fused quartz

VK OPTICAL FLATS



Accurate to .000001"

With VK Optical Flats, close checking of flat surfaces is simplified and more conveniently handled.

Shown here is the new Van Keuren monochromatic light, 22¼" wide, 17¼" high and 20" deep (in bench space). It is designed for use with large optical flats such as the one shown—a 10" diameter fused quartz double-surface master flat (accurate to .000001" both sides).

VK Optical Flats are available in sizes from ½" diameter to 10" diameter in .000001", .000002", or .000004" accuracy. They can be shipped within 30 days from order.

Catalog and Handbook No. 35 is available by writing: The Van Keuren Co., 177 Waltham St., Watertown, Mass. Ask for your copy.

VK

36th YEAR

THE *Van Keuren* CO.,

177 WALTHAM ST., WATERTOWN, MASS.

Light Wave Equipment • Light Wave Micrometers • Gage Blocks • Taper Insert Plug Gages • Wire Type Plug Gages • Measuring Wires • Thread Measuring Wires • Gear Measuring System • Shop Triangles • Carboloy Cemented Carbide Plug Gages • Carboloy Cemented Carbide Measuring Wires • Chrome Carbide Taper Insert Plug Gages.

You'll Cut Faster and Cut Costs with VICTOR BLADES

The secret is simply in selecting the *right* Victor blade for the job you have to do, and one of these four *is* the right one—

Victor "Moly"® High Speed Steel—Challenges all comparison as to economy and performance.

Victor "Molyflex"® High Speed Steel—Cuts like a genuine "Moly" but is so flexible it cannot be broken in use.

Victor High Speed Steel—The power blade that's unexcelled for fast cutting and durability.

Victor Unbreakable High Speed Steel—Absolutely shatterproof and unbreakable when in use. Fast cutting, flexible, long-lasting.

Your Victor Distributor Can Guide Your Choice

Ask him for the Victor Metal Cutting Booklet—a concise guide to blade selection for hand, power and bandsaw work. Depend on him for quick delivery of the *right* Victor blade from local stock. Use him as your source of supply for hundreds of the other items you need to keep your production uninterrupted.

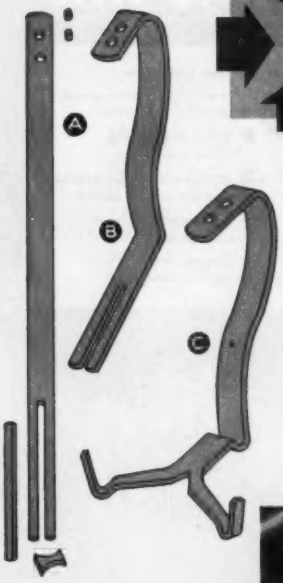
1021

Sold Only Through Recognized Distributors

VICTOR

SAW WORKS, INC., MIDDLETOWN, N. Y., U. S. A.

Makers of Hand and Power Hack Saw Blades, Frames and Metal and Wood Cutting Band Saw Blades.

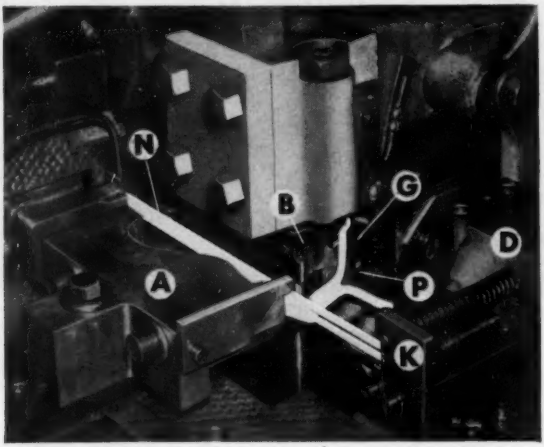


Stand is zinc-plated steel strip 0.05 in. thick by 0.625 in. wide . . . made in steps A, B and C.

Top performance in MASS PRODUCTION

60 vaporizer stands per minute . . . automatically formed in one operation on an A. H. Nilson combination press and 4-slide. Kaz products are proof that clever product design, combined with precision tooling by Nilson, increases production and lowers costs.

Without obligation, Nilson provides specific forming recommendations from detailed information. Send for A. H. Nilson catalogue . . . the first step to increased production.

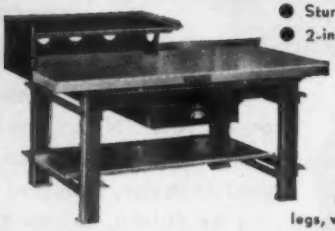


Final step in forming Kaz stands on Nilson 4-slide. Feet are spread, bent, crimped (G) with workpiece (P) on centerpost while next piece (N) is being cut off. Stop (K) on right slide (D) backs off after cut and workpiece (P) is wrapped around centerpost by die (A) when finished part is clear.

A.H. NILSON MACHINE COMPANY

1511 RAILROAD AVE. BRIDGEPORT 5, CONN.

Get *Quiet Efficiency* like this—



- Sturdy, tool box shelf
- 2-inch warp-proof, shrink-proof, fire-proof Cast iron top
- Steel drawer with pilfer-proof lock
- Lock Leveling Screws on two full length braces
- Convenient bottom storage shelf
- Strong, firmly braced legs, with wheels if desired

all along the line!

with CHALLENGE cast-iron top WORK BENCHES

For individual use or on a continuous line, Challenge Work Benches help get the job done — faster, easier, more profitably! Works *with* the machinist . . . bringing him better natural (left hand) lighting, wear-resistant top and handy storage facilities. Delivers real service dependability year after year.

A SIZE AND STYLE FOR EVERY WORKSHOP . . . EVERY PURPOSE

In 4 and 6 leg models. 3 styles, with or without shelf or drawer. 4 sizes from 28x48x2 to 28x84x2. Write for details to

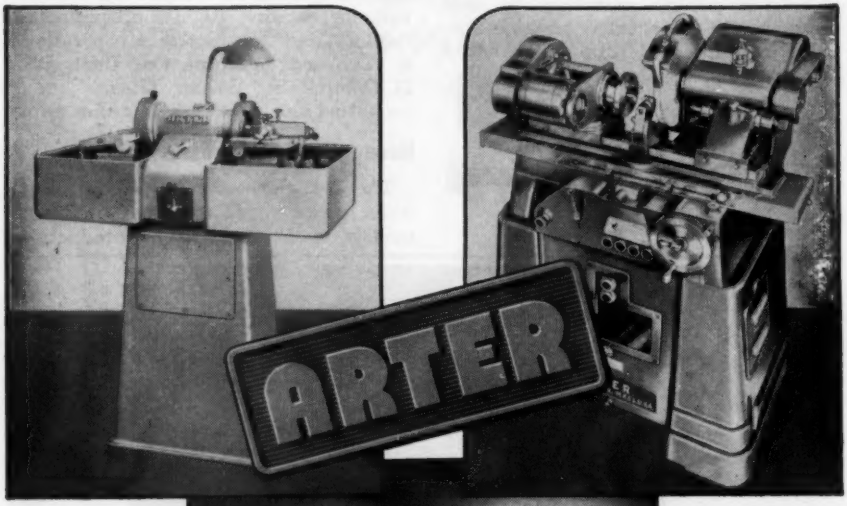
THE CHALLENGE MACHINERY CO.

Challenge TRADE-MARK ®

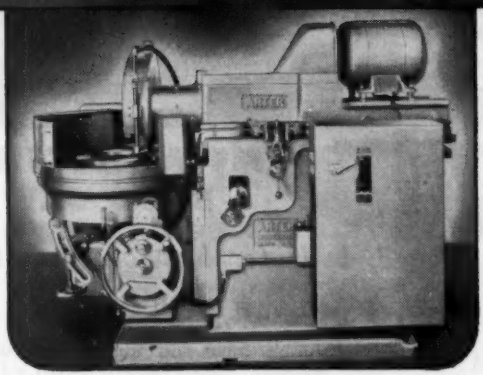
780

Office, Factories and Show Room
GRAND HAVEN, MICHIGAN

The Arter Family of Machines



CARBIDE
TOOL
GRINDERS



CYLINDRICAL
GRINDERS
INTERNAL
GRINDERS

ROTARY SURFACE GRINDERS

Chuck Capacity 8" to 40"

The Arter trademark on these machines is the sign of
ACCURACY • POWER • DEPENDABILITY.
Tell our engineers your grinding problems.
They'll find a way to lick them.

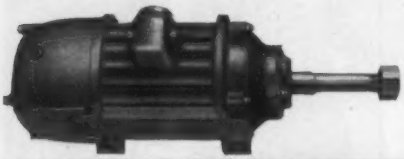
ARTER GRINDING MACHINE COMPANY

WORCESTER • MASSACHUSETTS

Agents in Industrial centers of United States and Canada

Motor arbor packs power in shortest possible distance

The Woods motor-arbor, having no V belts or pulleys, is claimed to pack the power in the shortest possible distance from the centerline of the arbor to the top of the motor: 3¼".



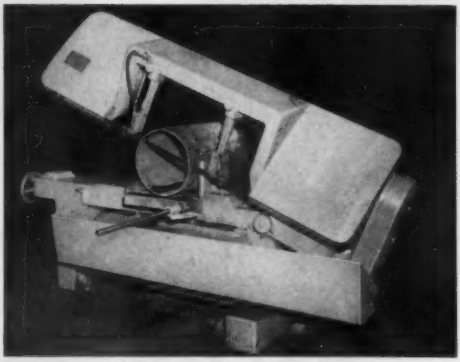
End-play of the arbor is prevented by annular spring rings. Large ball bearings have ample lubrication for operation for extended periods of time without attention. Rigid shaft promotes stability and smoothness of operation. S. A. Woods Machine Co., Dept. BB, 27 Damrell St., Boston, Mass.

Use ACTION Card, opposite page 64. Encircle No. 14

Heavy duty drill presses

The 1600 Series heavy duty drilling units are available in bench and floor models, with standard or production

MODEL 1220



KALAMAZOO

METAL CUTTING BAND SAW

big, rugged, built for heavier production

MODEL 8C
Cuts 8" round, 16" flat, 8" pipe.

MODEL 610
Cuts 6" round, 10" flat.

KALAMATIC AUTOMATIC BAR FEED ATTACHMENT for Kalamazoo Metal Cutting Band Saws.

Cuts 12" round, 20" flat stock. Accurate to thousandths of an inch, minimum burr and kerf. Four cutting speeds, four blade-tension adjustments for better sawing, longer blade life. Safety-designed throughout—only cutting section of saw blade is exposed. Positive power from heavy duty 1 HP motor. Available with coolant equipment.
Ask your dealer for details and demonstration.

MACHINE TOOL DIVISION

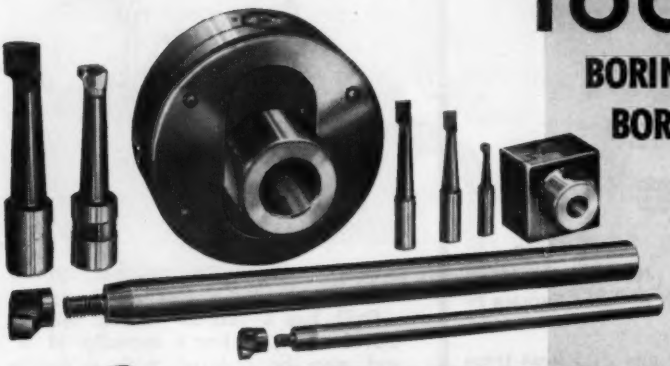
Kalamazoo TANK and SILO CO.

232 HARRISON ST., KALAMAZOO, MICHIGAN

for more *Accurate* cuts...
greater *Rigidity* in

BORING TOOLS

BORING HEADS
BORING BARS



Use CRITERION

BORING EQUIPMENT

BORING PROBLEMS? CLOSE TOLERANCE?

Try Criterion Boring Tools. Built with the same care and quality as the time-tested Criterion Boring Head.

THIS COMBINATION WILL PRODUCE RESULTS.

Boring heads from 1½ to 7 inch diameter. Boring tools, carbide or high speed steel, ⅜ to 1¾ inches diameter. Bore holes from ⅛ to 20 inch diameter.

Accuracy for the closest tolerance • Rigidity for the heavy cuts • Heat-treated parts for long wear

LARGE OFFSET SAVES TIME AND TOOL CHANGES

These tools will cut your boring costs.
See the complete line of CRITERION TOOL PRODUCTS at your local dealers or write for free catalog.

CRITERION
MACHINE WORKS
9312 SANTA MONICA BLVD • BEVERLY HILLS, CALIF.

SAVE HOURS
CUT HEAT TREATING COSTS

Quick Acting
JOHNSON No. 142
Hi-Speed Furnace

Save time, save gas . . . heat treat carbon and high speed steels, dies and tools with JOHNSON 142. Powerful burners provide fast uniform heat with time saving speed. Gets the job done while other furnaces are still warming up. Temperatures easily regulated with accuracy. Counterbalanced door opens upwards. Firebox 7" x 13" x 16½" lined with high temperature refractory. Complete with Carbofrax Hearth. G.E. Motor and Johnson Blower.

For temperature range
1300° to 2350°F $325.00
F.O.B. Factory

Models available in smaller firebox sizes. Write for Free Catalog.

JOHNSON GAS APPLIANCE CO.
570 E Ave. N.W., Cedar Rapids, Iowa

Since 1901 JOHNSON
FURNACES FOR INDUSTRY

tables, in single or multiple spindle units.

Drill has a full 16" swing, spindle travel of 6". It has a capacity of ½" and may be ordered with a Jacobs chuck or No. 1 Morse taper spindle. Standard equipment is a tilting table on all models and table raising mechanism on production models.

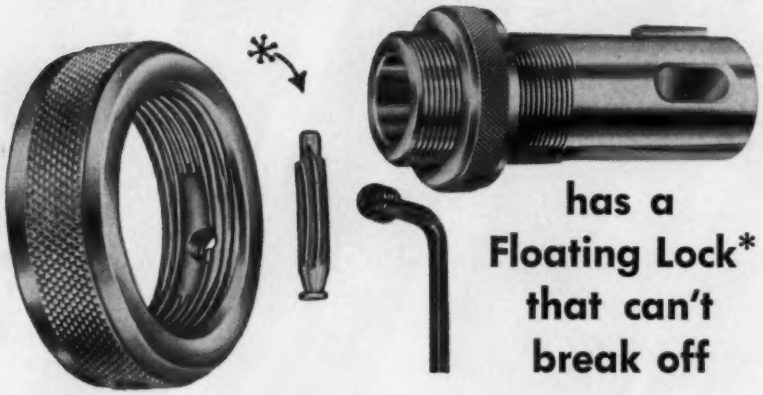
Other features include adjustable spindle return stop, quill lock handle, four precision ball bearings with sealed in lubrication on spindle, micrometer type depth stop with quick adjustment and vernier movement, and quick release motor base for changing speeds easily. Universal Gear Works, Inc., Dept. BB, 1301 E. McNichols, Detroit 3, Mich.

Use ACTION Card, opposite page 64. Encircle No. 15

50-ton punch press

A 50-ton punch press with bed area of 16" x 36" has been added to the line of Multi-Max punch presses manufactured by Diamond Machine Tool Co., 5103 Coffman-Pico Rd., Pico, Calif. These presses are designed for multiple and maximum stamping production and drawing up to 6" stroke. They are also used for conventional press brake work

The New GLENLOK Adjustable Adapter NUT



has a Floating Lock* that can't break off

This new nut eliminates broken sections or fingers. Tested on production in large auto plants for a year and now available to industry for the first time.

Heat treated and ground, these nuts are always accurate to .001, wherever set. For use on Adapters, Floating Holders and all tools using Acme Threads.

For quick tool changes on multiple spindle machines.

You'll find GLENLOK nuts efficient, economical.

Utility Tools

Write for new Catalog Sheet Bb & Prices

THE J. C. GLENZER CO. Inc.

1546 E. NINE MILE ROAD, DETROIT 20, MICH.

SARATOGA
ONTARIO
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SEMINOLE

LUDLUM TOOL STEELS are *clearly* marked ...you can't mix up grades in your stock

For Production Men Only

"TOOL STEEL HANDBOOK"

We say "production men only" because this is a *work* book, not a picture book. It's a case-bound volume of 196 pages, packed full of technical data on the analyses, uses, handling and shop treatment of all grades of A-L Tool and Die Steels. Sent free, but ask for it on your company letterhead, please.

Address Dept. MB-62

"What's *that* piece?" . . . "Are you *sure?*" . . . In anybody's toolroom or stock racks, the best inventory or material identification system is apt to go haywire once in a while—and sometimes with grievous results.

But not when you're using tool steel grades produced by A-L! Each length of Ludlum Tool Steel is clearly marked with its grade name every few inches the entire length of the bar—*stencilled* in such a manner that the marking stays bright and clear, and can't be blurred or wiped off in handling.

Even a small crop end on a machine bench is readily identifiable—you can't go wrong. And that's only a small part of the benefit you can realize by using Ludlum Tool Steels—available from stocks coast to coast. Let our Metallurgical Service go to bat on some of your tougher tool steel problems. ***Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pa.***

For complete **MODERN** Tooling, call

Allegheny Ludlum

WAD 5221

AL® FINE TOOL STEELS SINCE 1854

The machine shown here was built by Rehnberg-Jacobson, to perform a series of drilling, tapping, and reaming operations.

MAKE IT YOURSELF?

You can do it with **R-J UNITS**

Rehnberg-Jacobson ALL-MECHANICAL Drill, Tap, and Index Units are specially designed for YOU to use for making up YOUR OWN special-purpose machines — or for adding to or modifying some of the special-purpose (or standard) machines you now have. They are accurate, efficient, economical — and available in enough models and sizes to suit most every need. WRITE TODAY for Data Sheets giving complete *engineering information.*

TAP UNITS, for example, are made in four capacities from 5/16 - 18 and 1-1/4" stroke to 1-1/2 - 6 and 4-1/2" stroke. They are self-contained, with lead screw feed.

R-J REHNBERG-JACOBSON

REHNBERG-JACOBSON MFG. COMPANY

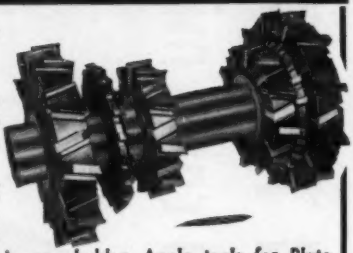
2135 KISHWAUKEE ST., ROCKFORD, ILLINOIS

APEX INSERTED-BLADE METAL-CUTTING TOOLS

APEX MILLING CUTTERS. Made with inserted blades, all drop-forged of selected steels.

Adjustable for diameter or width.

Single or multiple operations with blades of High Speed, Super Cobalt, Stellite, Rexalloy, or Carbide Tipped. Standard sizes, including large diameters, carried in stock.



APEX TOOLS FOR LIGHT OR HEAVY PLANER WORK

Adjustable serrated for maximum wear. Over 50 standard shapes of tool bits interchange in one holder. Angle tools for Plate Planers carried in stock. Special shapes to order.

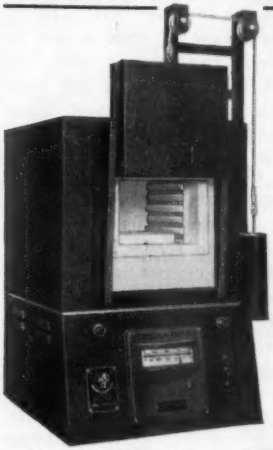
Tools drop-forged of High Speed Steel, Super Cobalt Steel, or tipped tools of Stellite, Rexalloy, or any grade or make of Carbide. Furnished ground ready for use.

Service representatives available.

Send for catalog.

APEX TOOL & CUTTER CO., INC. • SHELTON 14, CONNECTICUT

Designed for TOOL ROOM EFFICIENCY



HUPPERT Heat Treating FURNACE

Range: 300° F. to 2000° F.

Years of satisfactory operation in tool, die and machine shops, as well as laboratories have proven these furnaces to be ideal for production work. Huppert special features include High Temperature, Heavy Duty Kanthal elements—Multi-insulation—counterweighed and tight self-sealing door. Pilot lights indicate furnace operation. All connections factory installed, shipped ready for operation.

Model No.	Inside Dimensions			KW	Prices 220 volt single phase	
	Wide	High	Deep		with Huppert input controller	with electronic temperature controller
869	8"	6"	9"	4	$280.00	$480.00
11	8"	6"	12"	4	287.00	487.00
12*	8"	8"	12"	6	367.00	567.00
12A*	8"	8"	18"	9	471.00	671.00

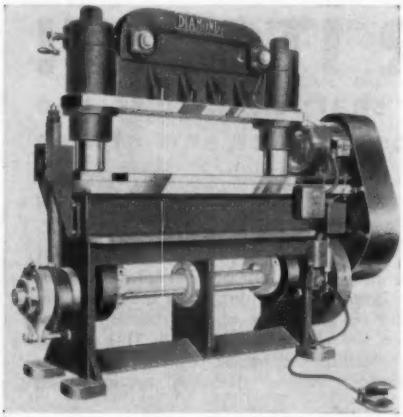
*For 2300° F. add $95.00 to No. 12 and $105.00 to No. 12A. No. 12A can be furnished for 3 phase at no additional cost. For floor model add $50.00 to above prices.

*Write for literature on complete line of furnaces and ovens. Ask for Hints on Heat Treating.

K. H. HUPPERT CO.

6845 Cottage Grove Avenue **Chicago 37, Illinois**

Manufacturers of Electric Furnaces and Ovens



and power shearing and for cutting strips or irregular shapes in felt or fiber material with steel rule dies.

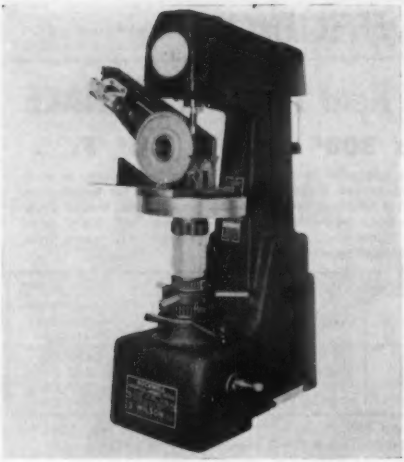
Ram area is 10" x 36"; shut die height 10" with maximum shut die height to order 24"; speed (strokes per minute) 70; ram adjustment 2"; motor required 5 hp; dia. of main shaft 4". They are of straight side twin column design, underneath double crank drive, back geared with herringbone heat treated alloy gears. The clutch equilibrator and balance gives easy clutch engagement and disengagement and prevents falling of the ram with the use of large and heavy dies.

Use ACTION Card, opposite page 64. Encircle No. 16

Line gear testing fixture

A new holding fixture, by which gears may be tested on the pitch line of gear teeth, has been announced by the Wilson Mechanical Instrument Div., American Chain & Cable Co. Inc., 937 Connecticut Ave., Bridgeport, Conn.

Designed for use on a Rockwell superficial hardness tester with a special gooseneck type Brale, this quick-change device will accommodate gears of various sizes in either a laboratory or production operation. The test cycle can



be completed in seconds, it is claimed.

As illustrated, the gear is placed on an inclined plane mounted on a sliding plate, the plate is then moved toward a positioning anvil which is designed to compensate for the diametrical pitch. The elevating screw is then raised to bring the Brale into contact with the gear tooth. A lock screw on the base plate, used to lock the inclined plane in position, is then tightened.

A locking clamp is located on the elevating screw. This is a safety device, which prevents injury to the Brale should the elevating screw be lowered too far. A constant center line is maintained by a pivot screw, which prevents the fixture from moving past this center line. The cam-type adjusting clamp then slides down. The gear is locked tightly in position by this cam, the Brale brought into actual contact with the gear, and the Rockwell hardness test cycle performed.

Use ACTION Card opposite page 64. Encircle No. 17

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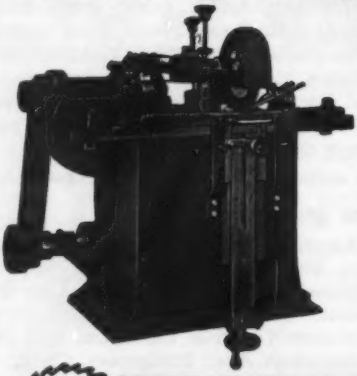


by sharpening just one gross of hack saw blades

You can resharpen a gross of hack saw blades at least 6 times—actually saving you the price of this machine.

WARDWELL Model EC Combination Grinder is the only single unit grinder adaptable for hack, band and circular saws that does not depend on the shape of the grinding wheel to form the shape of the tooth. This unique feature enables operator to grind a variety of blades without dressing or changing wheels.

Write for Bulletin EC Today.

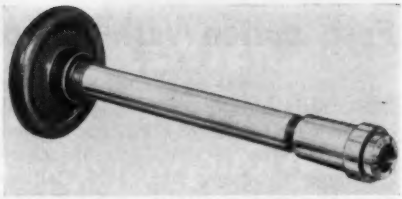
WARDWELL Manufacturing Co.
3807 Ridge Road, CLEVELAND 9, OHIO

Maker of largest line of saw and tool sharpening machines

Attachments for dividing heads

Draw-in bar and collet sleeve attachments for use with their dividing heads have been developed by L-W Chuck Co., Dept. BB, 23 S. St. Clair St., Toledo 4, Ohio.

One, for their 11" models BP and AU heads will take up to a ¾" round standard type 2L collet, and another for use with their 6½" Model SD head



takes up to a ⅝" round standard type 4 NS collet.

Use ACTION Card, opposite page 64. Encircle No. 74

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ACE ABRASIVE LABORATORIES
35 ROSELLE STREET MINEOLA, N. Y.

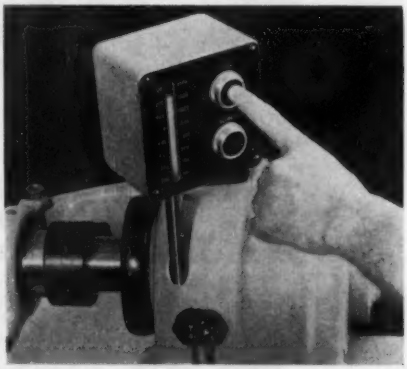
Push button variable spindle speed lathe

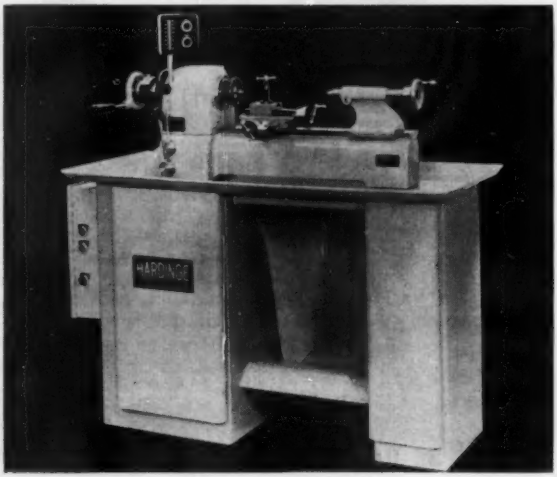
Instantly variable spindle speeds are achieved by simple push button control on the new Hardinge DV59 high speed precision lathe, recently announced by Hardinge Brothers, Inc., 1420 College Ave., Elmira, N.Y. Power operated from a control box located conveniently over the headstock, changes in spindle speed are accomplished by pressing either the "faster" button or the "slower" button until the desired speed is reached. An easily read speed indicator with a range of 230 to 3500 rpm shows the exact speed at all times. Only actual on-the-job experience can determine the correct spindle speed for each particular job to obtain the finest finish consistent with highest production.

Another new feature, furnished as standard equipment on the DV59 for the first time, is the ball bearing, lever operated collet closer which is claimed to give fast, positive collet gripping. Operators can open or close a collet or step chuck while the machine is running or stopped, saving production time. Collet tension is adjustable throughout the full range of light to heavy holding power without the use of tools. Fitted with the new 5C collet, the DV59 has 1 1/16" capacity.

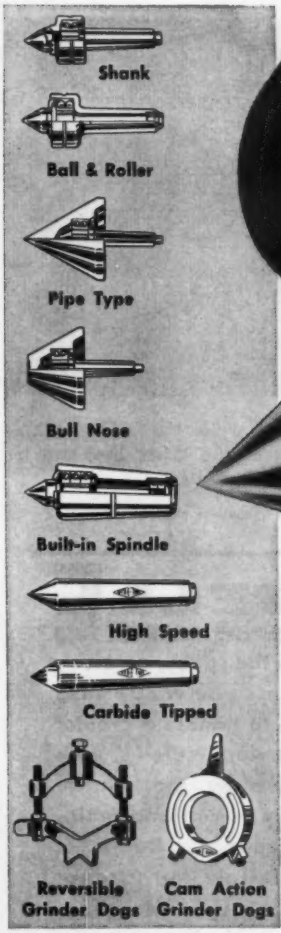
Use ACTION Card, opposite page 64. Encircle No. 26

Instantly variable spindle speeds from 230 to 3500 rpm are achieved by simple push button control box located over the headstock on the Hardinge DV59.





The Hardinge DV59 high speed precision lathe features as standard equipment a ball bearing, lever operated collet closer with full range of adjustable collet tension.



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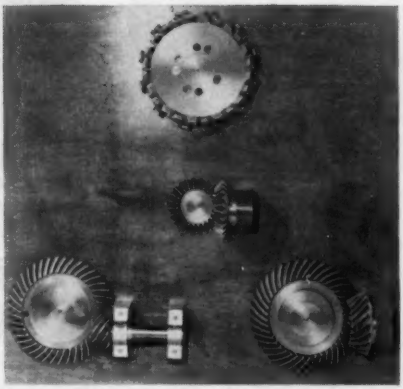
Method produces variety of gears with single cutter

The Unitool method, for cutting a variety of spiral bevel, Zerol bevel, and hypoid gears with a single cutter, has been developed by the Gleason Works, Dept. BB, 1000 University Ave., Rochester 3, N.Y.

Method is best adapted to cutting gears in small-lot quantities; is designed for use with the Gleason No. 106 and No. 116 Hypoid generators. It covers spiral bevel and Zerol bevel gears of any ratio, and hypoid gears of 3:1 ratio and higher.

The same cutter is used for both members of the pair, and each part is completed before removing from the machine. Cutters are of the segmental type, and are claimed to require no shimming or adjusting; each covers a



wide range of work sizes. Photograph shows a few of the gears that can be cut with a single cutter.

Use ACTION Card, opposite page 64. Encircle No. 29

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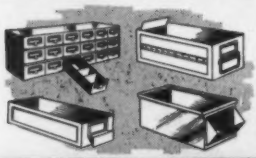

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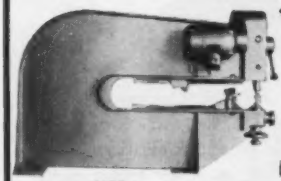

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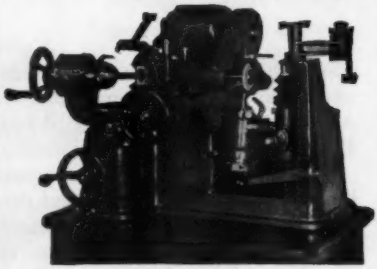

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A new lapping-polishing machine provides a mechanical method for lapping and polishing metallurgical samples, metallic sealing ring faces, and other metal parts requiring a highly polished surface.

Samples for electron microscope or brush analyzer examination can be finished in quantity in one-third the time necessary to produce one sample by hand, the manufacturer claims.

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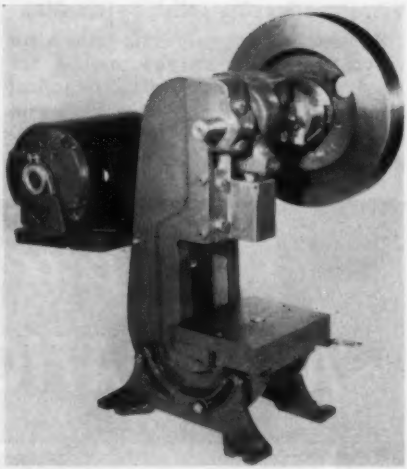
a specified finish. Finger-tip control of vibration regulates polishing speed. Available in models with bowl sizes from 5" to 24" in diameter.

Use ACTION Card, opposite page 64. Encircle No. 18

Two-ton press for small stampings

Press-Rite press Model No. 00 has a two-ton capacity, eliminates manual punching and assembling operations.

Press can be used for small stampings,

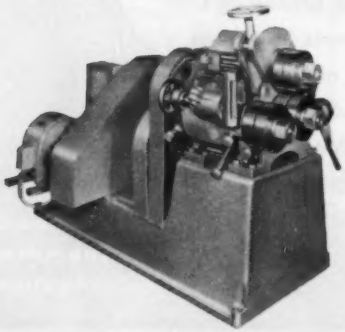


especially for single pieces, and for secondary or assembly operations.

A single trip safety mechanism is pro-

BELOIT

ANGLE BENDING ROLLS



These open end Bending Rolls, designed primarily for bending angles, channels, pipe, tubing, flat bars on edge and on flat and other similar material have exclusive features of design not available on any other angle bending roll made. Solid steel frames, heat treated roll arbors, bronze bushed bearings, heavy steel roll pinions, always in proper mesh regardless of roll opening, sturdy reliability of construction, all guarantee greater production capacity and uninterrupted service.

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vided as standard equipment, and this may be changed to continuous operation. Press has a ¾" stroke standard with 1" stroke optional. Flywheel speed is 270 rpm. Sales Service Machine Tool Co., 2357 University Ave., St. Paul, Minn.

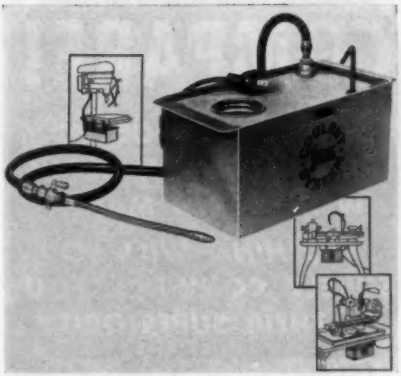
Use ACTION Card, opposite page 64. Encircle No. 19

Portable coolant system

A compact, 1 gallon, self-contained portable coolant unit can be easily attached to drill press tables and other small machine tools and benches, size 13"x6"x6".

Powerful enough for any small machine tool operation, unit has flow adjustment from trickle to full stream. It can be quickly moved from one machine to another.

New features are the permanently sealed pump and motor inside the tank. This motor operates in oil and never needs lubrication, the manufacturer claims. Made by Viking Industries, Dept.



MTB, 407 City Hall Bldg., Rockford, Ill.

Use ACTION Card, opposite page 64. Encircle No. 20

Spindle clamping device

A spindle bracket clamping device that makes the use of spindle locating and locking templates optional, has been developed by Thriftmaster Products

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CLUSTER WHEEL DRESSER CT-7

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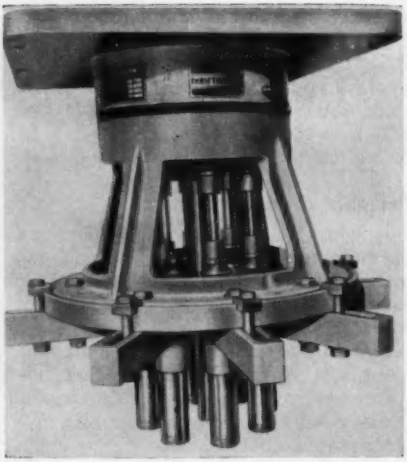
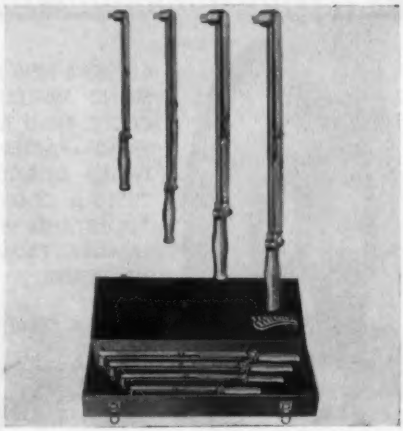


Corp., 1030A N. Plum St., Lancaster, Pa. Consisting of two clamping bolts per adjusting bracket, it is used with the Thriftmaster 9-spindle, heavy-duty full ball bearing universal joint type adjustable drillhead.

Use ACTION Card, opposite page 64. Encircle No. 21

Torque wrenches

The new series of Torque Measurrenches, for measuring right and left hand torque, employs the converging



scale method of torque reading. Accuracy is not dependent on delicate gears, levers or dials.

Calibrations are machine-cut for long life, accuracy and easy reading of the indicated torque, it is claimed. Available in four capacity ranges in two drive sizes. J. H. Williams & Co., Dept. MTB, 400 Vulcan St., Buffalo 7, N.Y.

Use ACTION Card, opposite page 64. Encircle No. 23

Powdered metal spherical washers

Spherical washers made of powdered metal are now being offered in a wide range of sizes by Lodding, Inc., Dept. N 67, 79 Beacon St., Worcester 1, Mass.

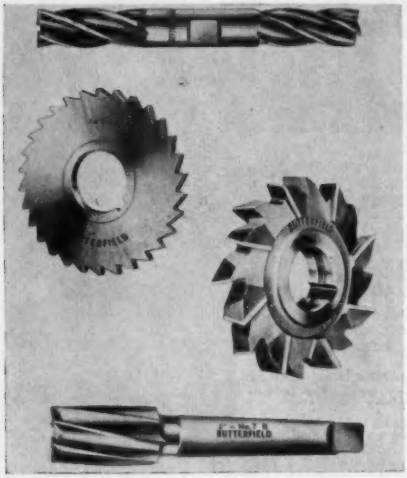
Higher tensile strength, uniformity and the elimination of brittleness are said to result from the use of powdered metal. This metal also retains lubricant well.

Use ACTION Card, opposite page 64. Encircle No. 24

Milling cutters and end mills added by Butterfield

Milling cutters and end mills have recently been added to the cutting tool line of Butterfield Div. of Union Twist Drill Co., Dept. BB, Derby Line, Vt.

Use ACTION Card, opposite page 64. Encircle No. 25



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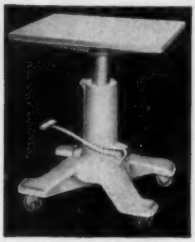
ELEVATING TABLE



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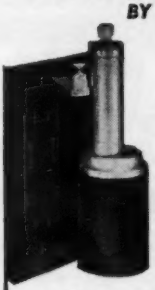

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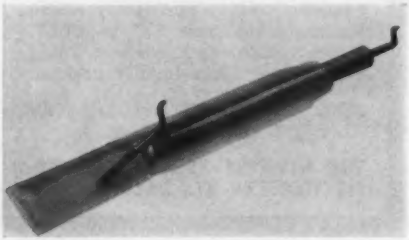
Deburring tool speed studies revealed

A swivel-action deburring tool is claimed to have reduced production time in speed studies recently completed by Universal Metal Products, Inc., Bassett, California.

BurrQwik, improved version of the Roth hand deburring tool, tested an average 33½% faster deburring time on a variety of cut, punched, molded and processed edges. Material hardness ranged from hardened stainless steel through the softer metals and plastics.



Interchangeable blades in two sizes, manufactured of hardened h s tool steel are provided for the deburring of all sizes of straights, channels, tubing, holes, radii. Rotating swivel-action permits the blade to automatically follow edges to be deburred. Wrist and arm fatigue are claimed to be reduced. Manufactured by Universal Metal Products, Inc., Dept. BB, Bassett, Calif.

Use ACTION Card, opposite page 64. Encircle No. 67

Higher pressures in hydraulic power unit

Logansport Machine Co., Inc., 803 Center Ave., Logansport, Ind., has announced engineering changes in its hydraulic power unit Model 6031 to provide additional pressure range from 1200 to 2000 psi. This model has previously been offered only in pressures from 250 to 1000 psi.

Use ACTION Card, opposite page 64. Encircle No. 68

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Leading industrial manufacturers now using Procunier Tapping Equipment are amazed at the "productive life" of these sensitive, high speed tappers. Precision made for precision work, they've been "taking it" and producing under most extreme production conditions with phenomenal results. Users report "less down time"; "higher quality parts"; "drastic reduction in tap breakage and parts spoilage"; "more speed"; "a rugged dependability." There's one obvious conclusion: "Procunier heads are better, more productive and unquestionably have longer life built in."

Procunier heads have many exclusive features: They provide a smooth "controlled tapping" action thru a unique clutch design—operating with a sensitive "cushioned action" that saves taps, improves work quality and enables "new" help to operate them like "seasoned experts." Get the full story of Procunier tappers and learn how industry is using them to increase production, reduce parts and tap spoilage and produce **higher quality work for less**—faster! Write for FREE brochure today—now!

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The most compact, powerful, dependable and efficient cylinders available. Any product is better and easier to maintain if it's Carter equipped. No matter what your application, there is a Carter cylinder to fit your product. Call us in today. You'll be glad you did.

You get these features

- Full 1 to 1 cartridge rod bearings
- Key type stainless steel lock ring
- Cup or piston ring construction
- Self-adjusting spring loaded packing
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- 40% less mounting space
- Cylinders with built in valves

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PHONE 1305

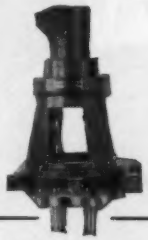
Only

THRIFTMASTER *Universal Joint Type* DRILL HEADS

have these exclusive* features

***Standard Full Ball Bearing Construction, including Spindles**

Driving assembly is Full Ball Bearing mounted with 3 Bearings on each spindle. Thrust load carried by radial thrust bearings.



***Standard Slip-On and Slip-Off Template Construction**

For accurate setting and locating spindle brackets are machined to receive slip-on and slip-off template.

6 **Standard Models** . . . Models U-608 and U-1000—Ball Bearing. Models U-620B and U-1012B—Plain Bearing, 11/16" or ½" min. centers. Models U-608-BS and U-1000-BS—Ball Bearing Gear Case, Plain Spindles.

Semi-Standard Heavy Duty Full Ball Bearing . . . ½" in Cast Iron—1-7/16" min. centers—7⅛" or 9¾" dia.
⅛" in Steel—1-13/16" min. centers—7" or 9⅜" dia.

Also Larger Adaptations and Full Line of Fixed Center Drill Heads.

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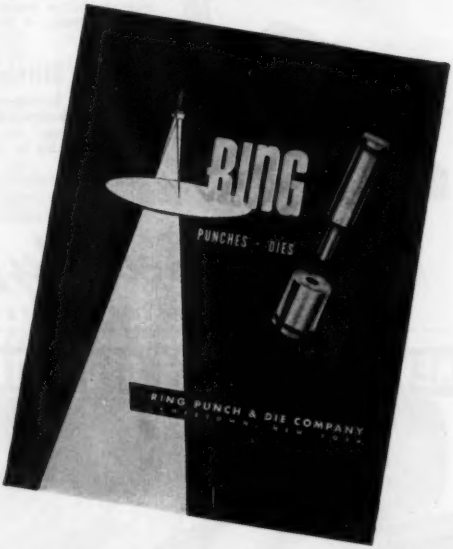

20 pages illustrating our complete line of perforating products. Detailed dimensions and prices for each size given. Available for the asking.

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Hard...
Tough...
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Precision-made of both Carbon Vanadium and high carbon, high chrome steels.

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RING PUNCH & DIE COMPANY
106 FOOTE AVENUE **JAMESTOWN, NEW YORK**

Save Time . . . Labor . . . Materials with BEVERLY metal cutting SHEARS

Inside SLOTTER

Makes cuts up to 8" inside edge of sheet. Sharp, clean burr-free cuts always assured. Cap. 16 ga. High strength aluminum alloy body; H.C.H.C. blades.

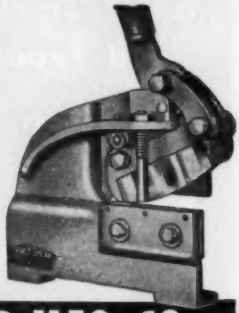
Throatless SHEAR

Make any cut—straight, irregular, curved. Exclusive design permits turning work any direction while cutting. 4 models—cap. to 3/16".

Slitting SHEAR

New "SS" Series—easier cutting with compounded linkage. 3 models — cap. to 3/16"; trimming capacity to 5/16" mild.

See your Beverly Distributor.
Write for FREE illustrated Bulletin.

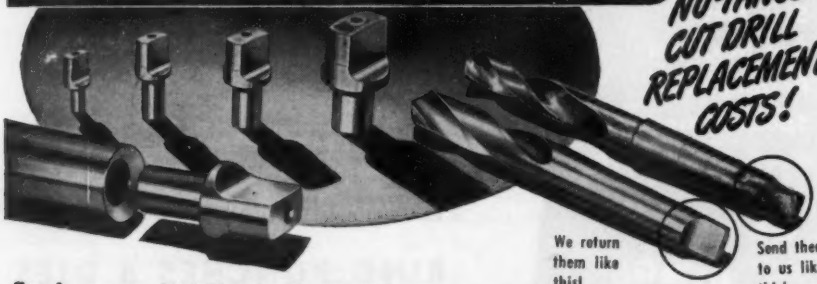


Beverly SHEAR MFG. CO.

3005 W. 111th STREET • CHICAGO 43, ILLINOIS

NEW DRILLS FROM OLD WITH NU-TANGS

NU-TANGS CUT DRILL REPLACEMENT COSTS!



Send us your old drills—we'll make them new again at a fraction of the cost of a new drill! Exclusive NU-TANG* process replaces twisted or broken tangs with brand new tangs of correct size — and with GUARANTEED ORIGINAL STRENGTH. No welding—No distortion —No shortening of drills—No sleeves.

Any drill, reamer, or other tool with a Morse taper in sizes 2 to 6 can be repaired perfectly this quick new way. Delivery—One week. Used by many leading industrial plants. Amazingly low cost—satisfaction guaranteed! Send for complete information.

* Patent No. 2,512,033

write today

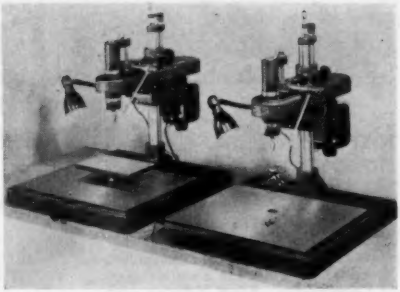
NU-TANGS INC. 1331 Bates Street Cincinnati 25, Ohio

Sensitive drilling machine

The Maximus, claimed to be a super-sensitive drilling machine, drills small holes (.004" to 5/16") in various materials

Base pad, 21" x 17", affords ample working space for tool room parts. Auxiliary demountable work tables for small work may be supplied.

Machine drills to the center of a 16" work piece. Four spindle speeds are obtained through one drive. A choice may be made from four available drives which provide spindle speeds from 750 rpm to 8750 rpm. The self-contained drilling unit swings radially on the column and locks in any position. The Hamilton Tool Co., Dept. B, Hamilton, Ohio.



Use ACTION Card, opposite page 64. Encircle No. 27

Large Capacity Feeding of Small Parts
with SYNTRON
PARTS FEEDERS
• Fully Automatic
• Parts Fed Single File in Oriented Position
• Rheostat Controlled
Provide accurate high speed handling of small parts to automatic machines and continuous processing equipment. Electromagnetic operation — Compact, easy to install, low cost.
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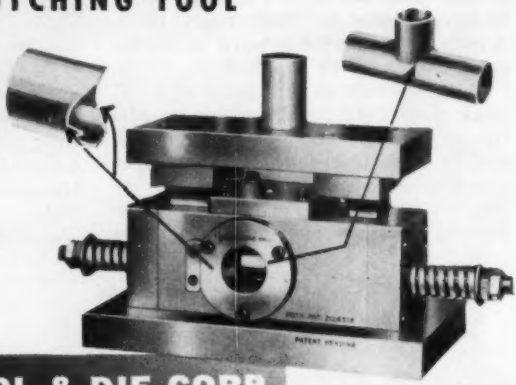
NOW TWICE AS FAST!

THE NEW TWIN-NOTCH PIPE AND TUBE

NOTCHING TOOL

NOTCHES CLEAN
NO EXTRA FINISHING
NO DEFORMATION

Standard ARC-FITS notch ½" to 2" pipe for "T" joints. Dies for each size. Immediate shipment. Special ARC-FITS for angular cuts or larger sizes. Send drawing and material specification for quotation.



other models of
ARC-FIT
AVAILABLE

VOGEL TOOL & DIE CORP.

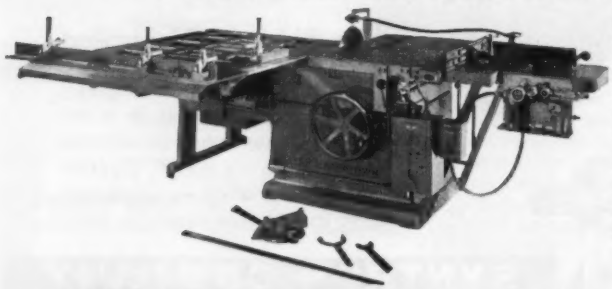
1825 N. 32nd AVE. • MELROSE PARK, ILLINOIS

SEND FOR DESCRIPTIVE BULLETIN

NEW! "OLIVER" TABLE SAW
with Hydraulic Feed

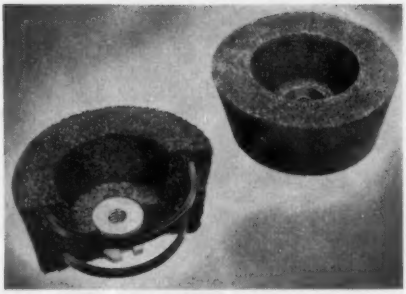
Cuts plates of Aluminum, Brass, Die Stock, Micarta, Plastics, etc.

Cuts metals and materials up to 48" wide by 1" thick, or 42" wide by 4" thick with 16-inch saw. Hydraulic feed of table is adjustable from 0 to 375" per minute. It is equipped with V-belt drive from 10 h.p. 1800 r.p.m. motor to saw arbor. Oil mist spray for cutting non-ferrous metals (as shown) is furnished as an extra. This "Oliver" Saw is exceptionally accurate. Write for Bulletin No. 88-DWH.



OLIVER MACHINERY COMPANY • Grand Rapids 2, Michigan

Cut-away photograph of a resinoid grinding wheel for portable grinders, having two rings embedded directly in the usable portion of the wheel. Grind-Away safety rings. They are claimed to have greater tensile strength than steel, but will abrade away during the normal cutting of the wheel without any interference to the grinding action. This makes it possible to reinforce the wheel where the actual reinforcement is needed. Rings provide the strength where the grinding is taking place. Tests run show that cracked wheels have been run up to 20% above normal operating speed without the wheel exploding. This safety feature has been extended at present only to straight wheels, and type 5, 6, and 11 cups



for portable grinders. Colonial Abrasive Products Co., Dept. BB, Conshohocken, Pa.

Use ACTION Card, opposite page 64. Encircle No. 28

America's "BLUE CHIP" Manufacturers

RELY ON B. JAHN PRODUCTION PROVED DIES TO KEEP QUALITY UP, OPERATING COSTS DOWN!

Manufacturers who supply millions of products — for millions of people — use progressive dies that produce with precision throughout long production runs. No chance of interrupted production, no costly breakdowns, no delays, no imperfections in die or finished piece — that's why the best known names in industry specify "B. Jahn Production Proved Dies." B. Jahn dies are painstakingly engineered for performance! Above all, every B. Jahn die is "Production Proved" in actual operation. This means up to 50,000 pieces can be run and delivered for inspection or assembly line use before the tool is shipped — a production tool warranted to operate in the customer's equipment to his complete satisfaction.

CARBINE MAGAZINE

EVERSHARP HYDRO-MAGIC RAZOR

CAR CIGARETTE LIGHTER PARTS

RAZOR BLADE CASE

Yours on request! The fact-filled "Story of B. Jahn Production Proved Dies."

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THE B. JAHN MANUFACTURING COMPANY • NEW BRITAIN, CONNECTICUT

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Ideal for DIE CAST TRIMMING

- Extra Wide Beds
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- Extra Large Ram Faces
- Extra Shut Heights
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- Pin Clutch or Air Clutch
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FOR DETAILED SPECIFICATIONS WRITE, WIRE OR PHONE

PRESSES OF UNMATCHED VERSATILITY FOR DRAW, PUNCH, TRIM, CUT AND ASSEMBLY OPERATIONS
20 MODELS — 16 TO 116 TON CAPACITY

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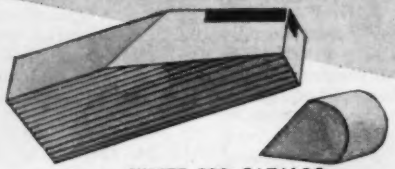
EVERYTHING from SOUP TO NUTS in Tungsten Carbide

- From the simplest standard tip to the most complicated tool built to your specifications or prints, Willey's service insures your complete satisfaction.

We specialize in "Specials"—so send your prints for prompt quotes and delivery dates.

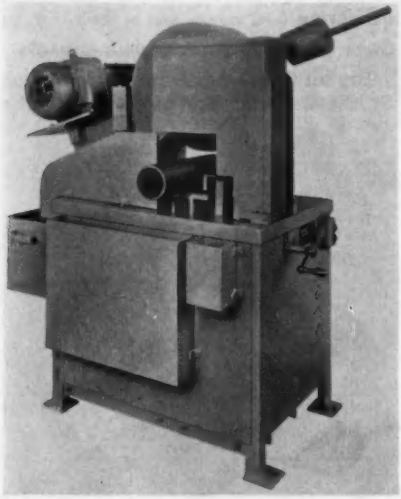


WRITE FOR CATALOG

WILLEY'S CARBIDE TOOL CO.
1342 WEST VERNOR HIGHWAY — DETROIT 1, MICHIGAN

Dry abrasive cutting machine

A dry abrasive cutting machine, capable of a speed of approximately 3 seconds per square inch of material being cut, is being produced by the Campbell Machine Divisicn, American Chain & Cable Co., Inc., Dept. BB, 929 Connecticut Ave., Bridgeport, Conn. Known as the Sever-All, Model No. 28, it is available in both stationary and portable types.



Machine is designed to handle material up to 4" square at 90° to axis for solid steel, 8" x 90° to axis for channels. These specifications are based on using an 18" dia. cutting wheel with a 10 h.p. motor, work size cutting capacity being reduced when a smaller diameter cutting wheel and less horsepower is used. The wheel is lowered into the work by a hand lever. The 1" dia. wheel spindle is driven by V type belts.

Use ACTION Card, opposite page 64. Encircle No. 30

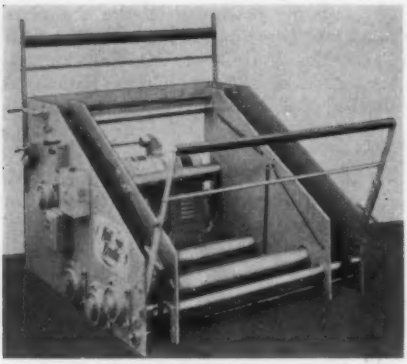
Koil Kradle capacity 7000 lb.

A heavy duty Koil Kradle of 7000 lb. capacity has been announced by Benchmaster Manufacturing Co., Dept. BB,

Engineered Live Centers . . . A properly designed Live Center is one of the fundamentals of setting up a job and requires a specialist's experience. Characteristic of the design of all STURDIMATIC LIVE CENTERS is a low overhang and a slight cushioning action that compensates for expansion due to heat shock and excessive thrust loads—reducing wear to a minimum. Send us your blueprints and specifications—we will see that your job is set up with the right Live Center. Standard shanks with Morse taper carried in stock.

STURDIMATIC TOOL COMPANY

3902 F STREET • DETROIT 16, MICH.

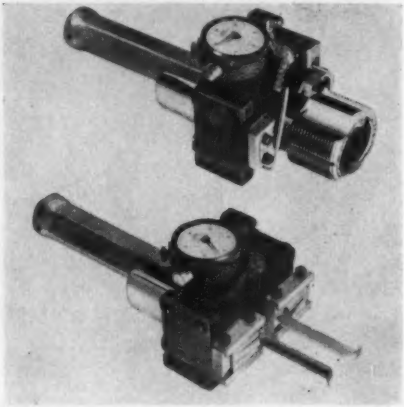


Gardena, Calif. It accommodates coil stock up to 42" in diameter and 40" maximum width, supplying a loop from which any machine can draw with comparative freedom, it is claimed. Unit will automatically operate intermittently by means of its vari-loop control or will function continuously at a selected speed, made possible by its variable speed drive. It can be used in conjunction with punch presses, shears, roll forming equipment, slitters.

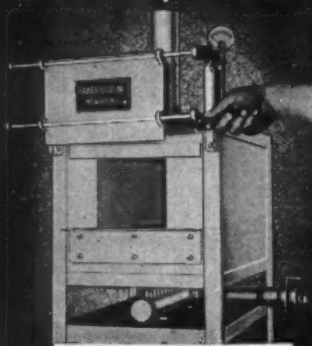
Use ACTION Card, opposite page 64. Encircle No. 31

Gage has interchangeable segments

Bryant Chucking Grinder Co., Clinton St., Springfield, Vt., has introduced a



FAST, ECONOMICAL HEAT!



$180.00 Complete
F.O.B. East Newark, N. J.

Model No. 7 Bench Type.
Maximum Temperature 2000° F
Heating Chamber 7" Wide.
12" Long. 5⅞" High.

WHY USE LARGE EXPENSIVE HEAT-TREATING EQUIPMENT FOR THOSE SMALL JOBS THAT CAN BE DONE BETTER, FASTER and CHEAPER WITH A BAKER FURNACE?

Atmospheric Burners.
No Noisy Blowers, No Parts To Wear Out.
1500° F In 15 Minutes and 1900° F In One Hour.
One Connection Only.
All Models Complete With Accurate Pyrometer and Thermocouple.

Illustrated Booklet Covering Larger Models on Request.

BAKER & COMPANY, INC.
850 PASSAIC AVENUE, EAST NEWARK, N. J.
NEW YORK CHICAGO SAN FRANCISCO

gage featuring inter-changeable segments which allow both internal threads and internal grooves to be checked with one gage. The gage, Model P-21, is built on the principle of an expanding plug which actuates a precision dial indicator showing the size comparison of the part to a master setting ring.

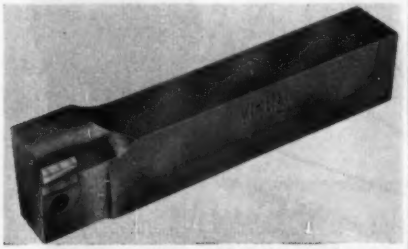
The unit is claimed to check threads of 5/16" to 5" diameter 8 to 10 times faster than conventional gaging methods. Checks the diameter and roundness of internal grooves or recesses up to 5" dia. and grooves located at depths up to 1" to 2" from a face.

Use ACTION Card, opposite page 64. Encircle No. 32

Single point cutting tool has throwaway insert

A single point cutting tool employing a wafer-type, indexable throwaway carbide insert; adjustable, mechanical chip control; and hardened, replaceable anvil has been announced by the Viking Tool Co., Dept. MTB, Shelton, Conn.

Tool features No-Grind inserts with either positive or negative rakes, indexed to the unused cutting edge after



each edge is worn. Negative rake inserts may be indexed on both sides.

Adjustable, mechanical chip control block locks with the top surface of the insert, metal to metal, to eliminate galling or wedging of the chip. A hardened, repleaceable anvil absorbs the shock in the event of damage resulting from accidental carbide fracture. Triangular and square inserts, style A, B, G, and standard shank sizes No. 12, 16, 54, 64, 85, 86.

Use ACTION Card, opposite page 64. Encircle No. 33

Grinding segment adhesive

Grinding segments can be reclaimed in your own plant by using a new adhesive recently developed by Chemical Development Corp., Dept. BB, Danvers, Mass.

Use ACTION Card, opposite page 64. Encircle No. 75

Gammons * REAMERS

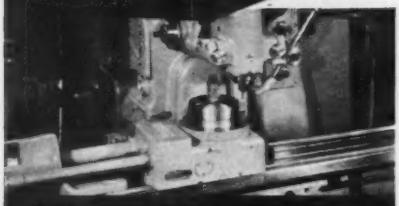
Originators and Manufacturers of Helical Reamers and End Mills

Helical Taper Pin Reamers Shipped by Return Mail

THE GAMMONS-HOAGLUND COMPANY

400 Main Street, Manchester 8, Conn.

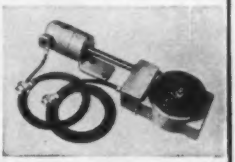
How To Increase Production And Improve Accuracy



With a SUNDSTRAND Automatic Index Base

In many cases, the addition of this Automatic Index Base has increased milling production enough to eliminate need for the purchase of additional machinery. It may be the answer to your milling production requirements. Call in a Sundstrand engineer. There is no obligation for this service.

Accurate Spacing, Powerful Clamping Insures Accuracy



Sundstrand Automatic Index Base

This automatic index base is designed so there is no strain against the index plunger during the cut. The base is locked by powerful clamping so that accuracy of index is not affected by heavy cuts.

Get Complete Data Free

This 8 page booklet contains production figures and specifications. Send for your copy today. Ask for bulletin 453.

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SUNDSTRAND MACHINE TOOL CO.
2535 Eleventh Street, Rockford, Ill., U.S.A.

Attach this page to your letterhead and forward for our new 16 page catalog

ACTUAL SIZE ➤

CONICAL TOOL CO.
3801 Buchanan S.W.
Grand Rapids 8, Michigan

Co-axial air-hydraulic cylinder

An air-hydraulic cylinder of co-axial design is in production by Modernair Corp., Dept. B, 400 Preda St., San Leandro, Calif.

The air cylinder surrounds the oil cylinder. Expanding exhaust air helps cool the oil.

Automatic models have with built-in controls of speed, direction, adjustable

fast traverse either direction, and automatic recycling. The unit develops hydraulic piston thrust of 3.14 x airline

MARVECO LIVE CENTERS

ENGINEERED AND MANUFACTURED BY SPECIALISTS . . .

After 13 years of service, the first MARVECO LIVE CENTER made is still in constant use.

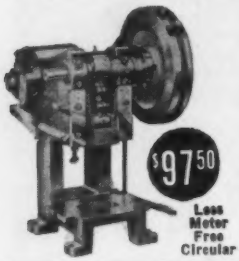
Based on long-life, precision performance, MARVECOES are the most economical live centers you can buy.

Write for quotation to Dept. B

MARVECOES ARE GREASED AND SEALED FOR LIFE

MARVEL TOOL & MACHINE CO.

ST. CLAIR, MICHIGAN



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2-Ton Power Bench Type.
Powerful, Dependable, Economical.

For light work—stamping, forming, riveting, etc—metal, fiber or other material.

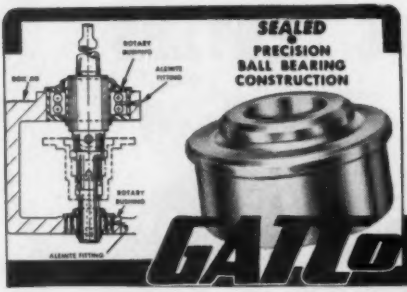
Overall height 19¾" . . . Base size 9" x 8¼" . . . Die Bed 6¼" x 8" . . . Ram face 1½" x 3½" . . . Ram Stroke ¾" . . . positive ¾" ram adjustment . . . sturdy, single pin, non-repeat hand lever clutch . . . V-belt drive . . . weight 105 lbs. Requires only 1/3 H.P. motor.

The machine of a thousand uses! Adequate for many types of work now done on large presses at greater expense.

30-Day Money-Back Guarantee. Order TODAY. Price $97.50 F.O.B. Clinton, Mo. (Includes Motor bracket, V-belt, motor pulley, less motor).

Dealer Inquiry Invited

ALVA F. ALLEN DEPT. MTB, **Clinton, Mo.**



ROTARY BUSHINGS

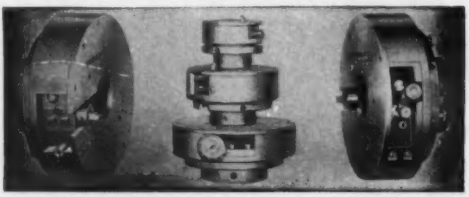
FOR DRILLING, CORE DRILLING ROUGH AND FINISHED BORING

The inner race of the GATCO bushing rotates with the tool, piloting and tool accurately below or above the work—or both.

Eliminates expensive tool construction—Reduces tool wear—Prevents seizure and pilot breakage—Especially adapted where precision is required.

Write for full information and prices

ROTARY BUSHINGS
42326 ANN ARBOR ROAD, U.S. 12, PLYMOUTH, MICH.
Telephone PLYMOUTH 1472



MUMMERT-DIXON

FACING HEADS

with Automatic Feed

One-way Tool Feed—6, 9 and 10" sizes.

Two-way Tool Feed—9, 12, 16, 20, 24, 30, 36, 40 and 46" sizes.

Save many costly set-ups.

Bulletin No. 4141 Gives Full Details

MUMMERT-DIXON CO., 122 Philadelphia St., Hanover, Pa.

Specify DESTACO FEELER STOCK

For precision fitting, checking clearances, inspection and production work. Available in 12" strips, ½" wide, in cellophane, packed 12 pieces of one thickness to a box; also in 25-foot coils. 14 standard thicknesses from .0015" to .015".

DESTACO DETROIT STAMPING COMPANY
347 MIDLAND AVENUE • DETROIT 3, MICHIGAN

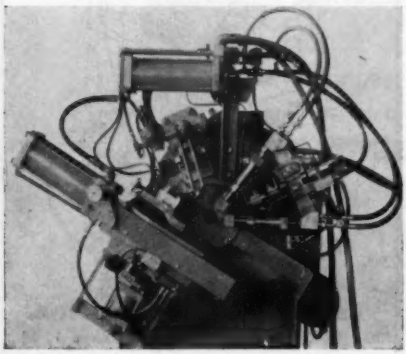
24-HR. SERVICE on
Special CARBIDE TOOLS
Yes, 24-hour service on:
★ Modifying standard tools right out of stock to your specifications.
★ Re-working draw dies and punches.
★ Tube mill scarfing tools.
Two and three-day service on NEW flat and circular form tools
Standard tool
Modified to:
Please send inquiries to (Car-Mac Division)
CAREY-McFALL CO.
2156 E. Dauphin Street • Phila. 25, Pa.

pressure, and pull of 2.7 x airline pressure. It is available in any stroke length to 72".

Use ACTION Card, opposite page 64. Encircle No. 34

Hot spinning machine welds and closes tubing

To weld and close one end of a piece of tubing this hot spinning machine automatically feeds the tube, heats it to the proper temperature, spins and welds the end to seal it and ejects the piece.



Machine handles tubing up to 3" od, and uses either oxygen-acetylene or induction heating. Manufactured by the Modern Machine Tool Co., Dept. BB, 2005 Losey Ave., Jackson, Mich.

Use ACTION Card, opposite page 64. Encircle No. 35

Cylinders have integral valves in rear head

The A. K. Allen Co., Dept. B, 57 Meserole Ave., Brooklyn 22, N.Y., has announced the introduction of Allenair models SVA & SVE cylinders, which feature integral valves in the rear head and are available in 2" and 3" bores, any length of stroke up to 60" and with or without adjustable cushions.

The cylinders have ground and polished stainless steel rods, honed brass tubes and Nylined bearings. The built-in valves are of the slider type. Slider

MANHATTAN'S MIRACLES!
GOVERNMENT SURPLUS

SAVE 80%

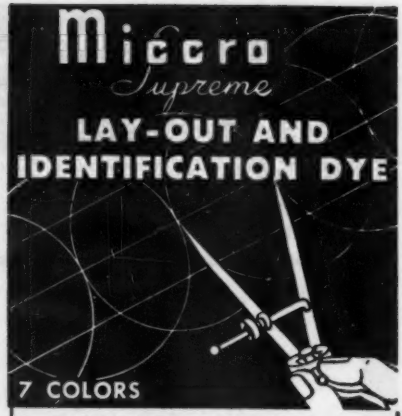
SET OF CARBON STEEL ALL NEW
HAND REAMERS
STRAIGHT FLUTE *In Wooden Case*
SIZES 1/4" to 1-1/4" IN 32NDS

Tremendous savings on all new cutting tools. Send us your inquiries and write for circular listing sensational bargains!

Regular price $180.
OUR low price only $35.00
Limited quantity!

MANHATTAN SUPPLY COMPANY
The Cutting Tool Discount House
151-A GRAND ST., NEW YORK 13, N.Y.
Telephone: CAnal 6-4992

Miccro
Supreme
LAY-OUT AND IDENTIFICATION DYE



7 COLORS

For Tool, Die, Pattern or Template layout on metal . . . Quick identification of bar stock, sheets, strips or parts . . . Shows up in sharp relief—dries instantly . . . Write for sample and circular on company letterhead.

MICHIGAN CHROME & CHEMICAL COMPANY
8615 Grinnell Ave. • Detroit 13, Mich.

NIELSEN
Heavy Duty
Live Centers
Write for catalog of live centers

Adapted for heavy duty work. Precision type ball and roller bearings assure maximum capacity for high speed production and long service.

NIELSEN, INC. LAWTON, MICH.

STOP
OILY FLOOR MISHAPS

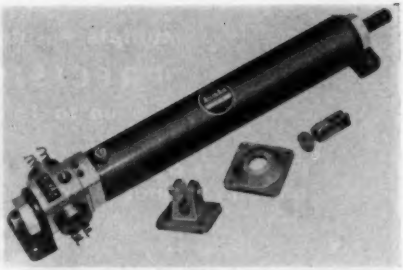
with Tamms
DRY-IT
Natural or Calcined Fuller's Earth 10-44 mesh

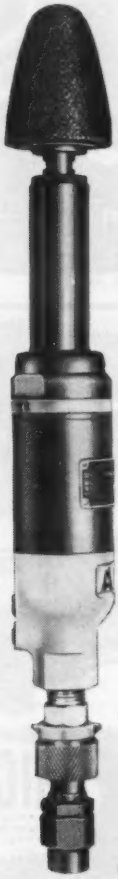
Tamms Industries, Inc.
228 N. LaSalle St. Chicago 1, Ill.

is actuated by a spool whose instantaneous motion is achieved by momentarily bleeding air from one end of it or the other.

On model SVE the actuation of the cylinder is accomplished through two solenoids available for either 110V or 8V operation. On model SVA, the actuation is achieved through two bleeder valves.

The valves feature large ports throughout for fast actuation and two





NEW

ARO HEAVY DUTY 3" GRINDER

Smaller...Yet More Powerful

WEIGHT .....5-1/2 POUNDS

LENGTH .....16-3/4 INCHES

DIAMETER .....2-1/32 INCHES

SPEED .....17,000, 14,000, 12,000, 9,000 RPM (Governed)

SPINDLE .....5/8" x 11", 1/2" x 20", 3/8" x 24"

TRY IT! COMPARE IT! BUY IT!

Write for Bulletin Number 5459T

THE ARO EQUIPMENT CORPORATION
Bryan and Cleveland, Ohio

Aro Equipment of California, Los Angeles, Calif.
Aro Equipment of Canada, Ltd., Toronto 1, Ontario
Offices in All Principal Cities

ARO ®

AIR TOOLS
ALSO... AIR HOISTS...
LUBE EQUIPMENT...
AIRCRAFT PRODUCTS...
GREASE FITTINGS

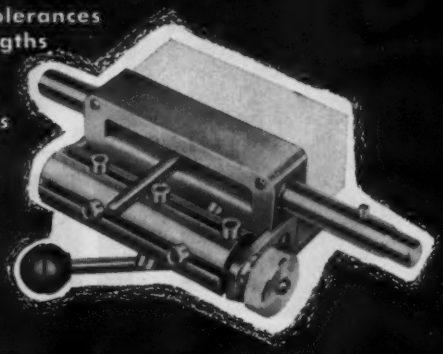
Multiple Position *Lathe* Carriage

PRECISION-STOP*

. . . up to 15 possible positions

- Maintains critical tolerances on longitudinal lengths
- Set up to required positions *in seconds*
- 3 inch stop bar travel

Dealer and Distributor Inquiries Invited



*Pat.-Pend.

EDWARD JENTSCH, Inc.

11 Penobscot St. Clifton, N. J.

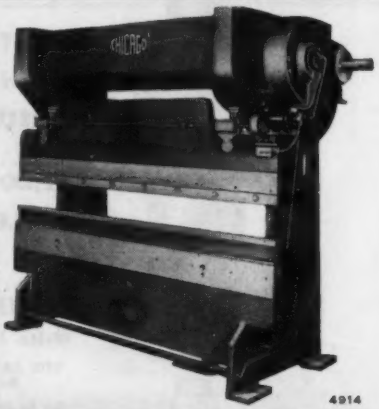
CHICAGO

STEEL PRESS BRAKES

43 Standard Sizes

Readily adapted for a wide variety of bending, forming drawing, notching, blanking, punching, embossing, etc.

DIES Complete Line of Induction Hardened Dies for All Makes and Sizes of PRESS BRAKES.



4914

DREIS & KRUMP MANUFACTURING COMPANY

CHICAGO STEEL BENDING BRAKES BOX and PAN BRAKES PRESS BRAKES

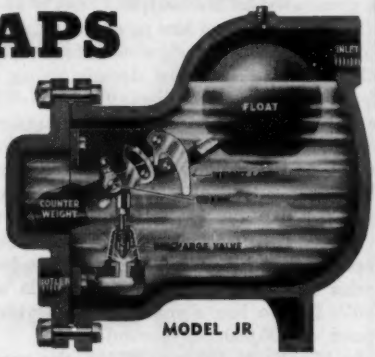
7440 S. Loomis Boulevard, Chicago 36, Illinois

Solve Sludge Problem with Nicholson's

New AIR TRAPS

With the introduction of a new oil-eliminating feature, Nicholson air traps enable you to enjoy the advantages of the positive intermittent action of a float-operated air trap without the common problem of oil congealing on the mechanism and impeding or stopping its action. Three types; pressures to 1500 lbs. For details send for . . . *Cat. 953*

117 Oregon St., Wilkes-Barre, Pa.



W. H. NICHOLSON & CO.

TRAPS · VALVES · FLOATS

built-in speed controls. The solenoid coils are molded in an epoxy resin and impervious to moisture conditions.

Use ACTION Card, opposite page 64. Encircle No. 36

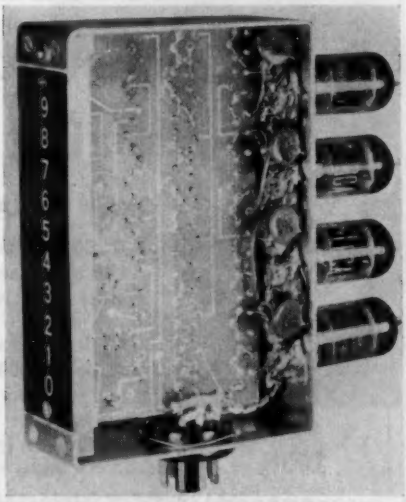
New type digital decade counters

Two new type digital decade counters, each available in three variations, for use wherever high-speed electronic counting is required have been announced by the Brush Electronics Co., Dept. MTB, 3405 Perkins Ave., Cleveland 14, Ohio.

Both types employ the printed circuit principle, thereby permitting maximum ventilation, lower operating temperature, and longer life, it is claimed.

The type "A" group has decades with a staircase output of voltage proportional to the count. This enables the output of the decades to be recorded on a direct writing oscillograph.

The type "B" group has decades with a four-line coded output which can be used to operate mechanical printers.



Both types are applied to Models 100, N-100, and N-101. These are high speed

electronic counters which will accept input pulses at rates varying from 0 to 100,000 counts per second. For each ten impulses received at the input, one pulse is generated at the output.

Model N-100 is a low power neon version similar in design to Model 100 which is the standard decade using a drum or meter type display. The N-100 is designed for use with plate supplies of 150V. Maximum counting speed for N-100 is 100,000 counts per second and the pulse output of one counter is suitable for driving the following counter.

Model N-101 is designed as a direct replacement for neon type counting decades operating at plate potentials of 300V. It also has a maximum counting speed of 100,000 per second.

In Models N-100 and N-101, the progress of the count and the final value are displayed on an illuminated, numbered panel as a single digit in the decimal system. Counting units in these models also can be cascaded to provide any desired counting capacity.

Use ACTION Card, opposite page 64. Encircle No. 37

Cold weld eliminated with live center

A live center designed to eliminate the cold weld problem has been announced by Nirol Mfg. Co., 82 U.S. Highway 22, North Plainfield, N.J. It has only five movable parts (exclusive of such parts as set screws, lock ring, etc.) and is claimed to reduce overhang to minimum, thus eliminating vibration and chatter and increasing machine capacity.

High radial and thrust loads are accommodated by the three sets of bearings within the tool. Two sets of needle bearings encompass the spindle maintaining rotation accuracy to within .0002". The third, a ball type end thrust bearing, increases the center's capacity to withstand heavy loads. The remaining movable part is a pressure spring which

80% faster finish sizing with DEKA BORE

ONLY DEKA-BORE

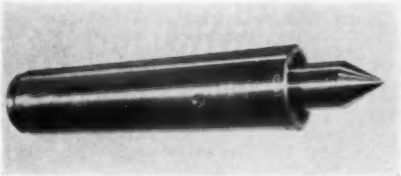
- Can be adjusted in fractions of 1/10,000" on the full diameter as easily as reading 1/16" on a steel rule. *Not a vernier or scroll adjustment.*
- Can be calibrated in increments of .00005 on radii or .0001 on diameter as easily as picking up .002 on a conventional micrometer dial.

100% guaranteed!

Attach this ad to your letterhead and mail for a free demonstration or literature!

PRECISION TOOL & MFG. CO. OF ILL.

1305 S. Laramie Ave., Cicero 50, Illinois



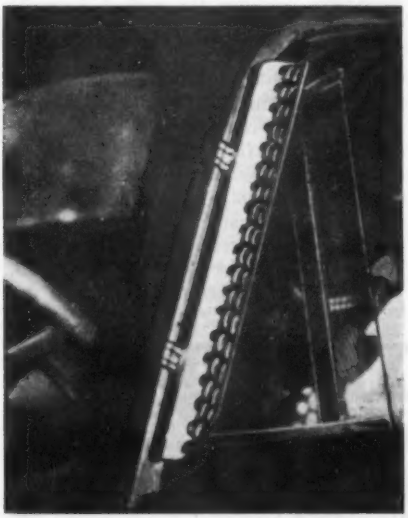
automatically compensates for work expansion and contraction due to heat. This feature avoids continual resetting of the tailstock and eliminates cold weld.

Centers are made in all standard sizes with either standard taper or straight shanks for use on lathes, milling machines and grinders. Special sizes or tapers can be made on order.

Use ACTION Card, opposite page 64. Encircle No. 38

Wind noise silencer for cars

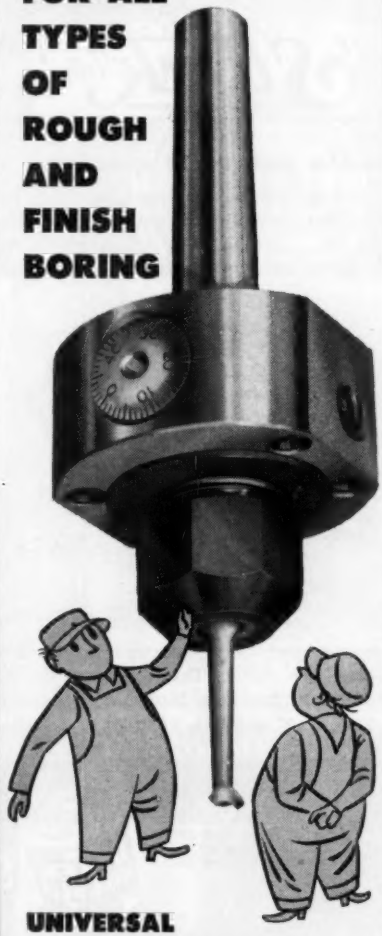
Wind Silencers are claimed to reduce wind-roar in automobile driving. Unit is made of stainless steel and is simple



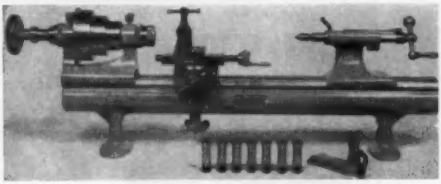
to install in any car. American Homecraft Co., Dept. BB, 3714 Milwaukee Ave., Chicago 41, Ill.

Use ACTION Card, opposite page 64. Encircle No. 39

UNIVERSAL
BORING CHUCKS
FOR ALL TYPES OF ROUGH AND FINISH BORING



UNIVERSAL ENGINEERING CO.
FRANKENMUTH 10, MICHIGAN
183-B



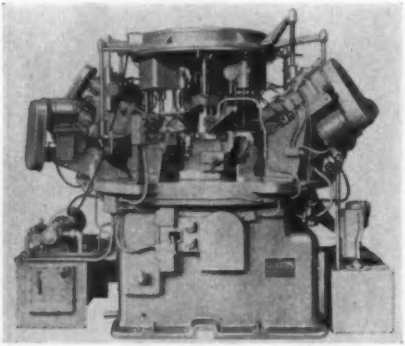
STARK No. 3½ Lathe, 32" bed, Cone Bearing Headstock, Screw Tailstock, Compound Slide Rest, Tip-over Hand Rest, Collets 1-64" to ½" by 64ths.

The originators of the American Bench Lathe, Stark has been building quality bench lathes for over 92 years. You can depend on Stark.

"Stark" TOOL COMPANY
118 Central Street Waltham, Mass.

Machine performs 23 operations

A mass production machine built by The Morris Machine Tool Co., 947 Harriet St., Cincinnati 2, Ohio, performs 23 operations on a four barrel carburetor part and produces up to 375 pieces per hour. The machine drills, reams, countersinks, taps and spot faces a variety of angular, vertical and horizontal holes in the carburetor air horn die casting. There are six rack-fed auxiliary heads mounted on a platen or table that surrounds the indexing load table. Heads perform horizontal and angular operations.



The center column of the machine carries a mushroom head which is hydraulically actuated to feed the vertical spindles into the parts at the proper station. The operation of the mushroom head also actuates the rack-fed auxiliary heads.

Use ACTION Card, opposite page 64. Encircle No. 50

New 12" stainless steel blade for combination squares and sets

Easily read black graduation on the stainless steel finish will be found on a 12" blade for users of combination squares and sets. The stainless steel is protection against moisture, perspiration, acid and corrosion-causing agents. Brown and Sharpe Mfg. Co., Dept. B, Providence 1, R.I.

Use ACTION Card, opposite page 64. Encircle No. 51

DYKEM
STEEL BLUE
Stops Losses
making Dies and Templates
Popular package 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.
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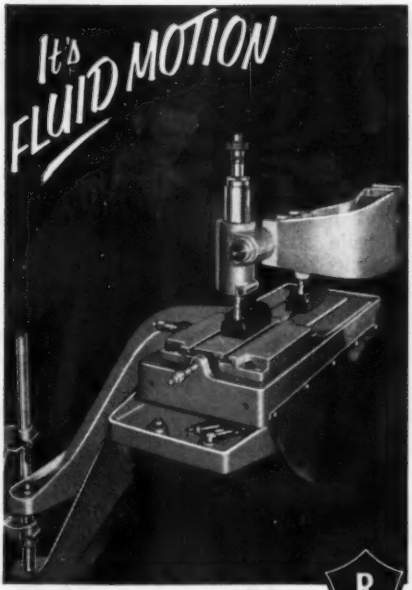
THE DYKEM COMPANY
2301G North 11th St. • St. Louis 6, Mo.
DYKEM STEEL BLUE
SPECIMEN
With DYKEM Steel Blue
Without DYKEM Steel Blue



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MASTER MOLD MAKERS SAY
they save up to 50% with
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DUPLICATOR TABLE

in the production of

- Plastic, Rubber and Glass Molds
- Forging and Die Cast Dies
- Punches, Contoured Parts

MOUNTS ON ANY BRIDGEPORT MILLING MACHINE

- DUPLICATE any shape
  2 or 3 dimensional with ease
- Capacity 6" x 6"
  ratio 1 to 1 with master
- Single lever table control
  for ease of operation
- Table floats on precision balls
- Mounts on mill in matter of minutes

Write for descriptive literature

J. M. KALINS & COMPANY
115 East Washington Ave., Bridgeport 8, Conn.
(Dealer inquiries invited)

HOW TO INSURE TOP METALWORKING PERFORMANCE for only $1.00

Send for a trial order of CMD ANTI-SCORING LUBRICANTS

For top performance on lathe centers, grinding, press fit, stamping, die posts and many other operations—CMD ANTI-SCORING Lubricant can't be beat. It makes your operations smoother, faster, easier, and of course more profitable. Prevents scoring, seizing, galling... all bugaboos in modern machining work. This trial order will start *you* on *your* way to top performance where a high pressure lubricant is needed. You will be surprised to find how long it lasts. Get yours today in both oil and grease consistencies.

TRIAL ORDER—
TWO FOUR OZ. TUBES $1.00

Send me my order of CMD right away!
Bill me ☐ Bill my company ☐

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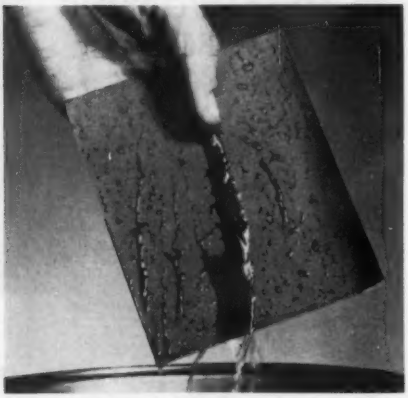
Chicago Manufacturing and Distributing Co.
1906 West 46th St., Chicago 9, Illinois

CHICAGO MANUFACTURING AND DISTRIBUTING CO.

Superfine wet sandpapers for quality finishing

Two new tough, very fine waterproof sandpapers have been introduced by Behr-Manning Corp., 654 Seifert St., Troy, N.Y. The wet sanding properties embodied in these new 500-A and 600-A grit papers should make them suitable for quality wood and metal finishing work. Developed especially for the wet sanding of lacquer finish coats.

Use ACTION Card, opposite page 64. Encircle No. 52



Electrode for welding high tensile strength joints

A new electrode for welding high tensile strength joints has been announced by The Lincoln Electric Co., 22801 St. Clair Ave., Cleveland, Ohio. Called Jetweld 2 HT, it contains iron powder in the coating, operates on either ac or dc, with ac operation preferred.

Spatter is claimed to be reduced to a minimum, and the smooth appearance on cover pass welds meets automatic welding standards. Electrode is classified as E-7020 and is available in 7/32" diameter.

Use ACTION Card, opposite page 64. Encircle No. 53

I'm the W.H.O.* of
WHO'S WHO
in the precision screw machine products field
Making the finest
SET SCREWS CAP SCREWS
COUPLING BOLTS
MILLED STUDS
. . . our specialty
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Ottemiller products are sold through Mill Supply Houses and Industrial Distributors.

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TOOL PROBLEM
Columbus Die-Tool has been solving tooling problems for over 45 years. Expert designers and builders of all types of tools and special machinery. Write us today!
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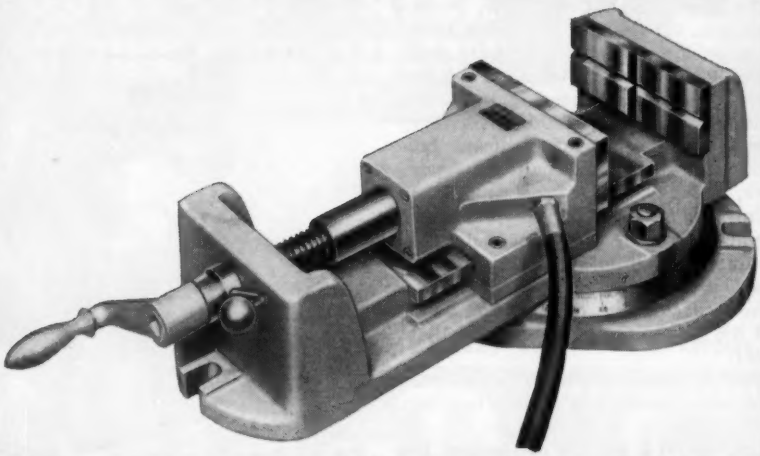

You've Never Had It So Good!

The new Wilt-O-Matic "MM" has all the features machinists have wanted for years. It's low and compact—nothing extends above the jaws. It's completely automatic, with an adjustable locking force up to 9000 lbs. . . . and with finger tip control. "MM" can perform 800 clamping operations per hour, saving up to 80% of loading time. "MM" can't clog, because it's completely enclosed. Insertion of specially formed jaws makes "MM" an automatic holding fixture that saves tooling expense too!

It's true! You've NEVER had it so good . . . or so reasonable! Complete "MM" vises in 6" size start at $224.00

Ask your local distributor, or

ATTACH THIS AD TO YOUR LETTERHEAD
FOR A FREE TEN DAY TRIAL OR FREE LITERATURE

There is absolutely no obligation to you.

"The Finest Name In Vises"

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925 WRIGHTWOOD AVE. • CHICAGO 14, ILLINOIS

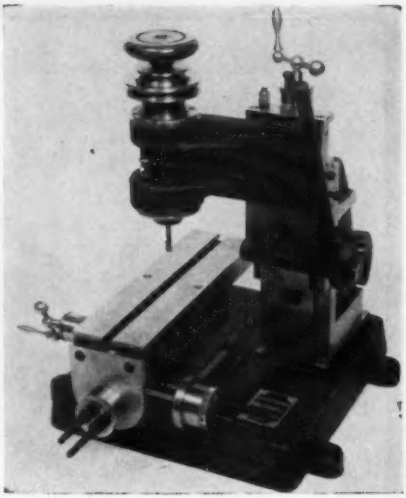
WILTON TOOL CANADA LTD. GUELPH, ONTARIO, CANADA

Improved precision miller

The Micromill, built by F. W. Derbyshire, Inc., 157 High St., Waltham, Mass., for precision milling, has been redesigned to include four-position stops in order to provide the operator with four positions in each direction. Also they provide the means of accurate hole location quickly on small jig boring work, it is claimed.

Unit will handle drilling, reaming, tapping, counterboring, spot facing and grinding in addition to milling. On jobs where it is desired to space a number of holes accurately, the stop can be set and the workpiece centered to drill or cutter.

Another improvement is a new headstock with pre-loaded duplex bearings. With speeds up to 20,000 rpm, the designers claim a spindle run-out of less than .0001 at the mouth of the spindle. A standard Magnus chuck, capacity from .004 to .315, or a No. 1A Jacobs drill chuck, capacity ¼", can be used to hold drills or other tools.



Use ACTION Card, opposite page 64. Encircle No. 54

Lehigh
TRACER-TOOL
PROFILE-TRACING LATHE ATTACHMENT

Proven in 101 practical shop and production applications!

For Precision
DUPLICATING
With any LATHE, PLANER, BULLARD — with any type of tool

IT WILL PAY YOU TO INVESTIGATE THIS SIMPLE
LOW COST
Heavy Duty Tool

Cuts duplicating time from hours to minutes. No complicated Hydraulic or Electronic controls. Requires no permanent lathe alterations. Uses easily made, low cost templates. Unlimited radii, threading, steps, facing, grinding, boring—on any metal. Models to fit lathes of all sizes.

Write for Catalog, Engineering Bulletins, and help on any Duplication Problem

Factory Trained Representatives at your service in all principal areas.

Air Control Division

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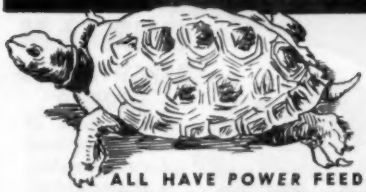
M-1500 WITH ROTARY STYLUS

SOONER or LATER

YOU WILL COME TO KNOW THAT "A BORING HEAD THAT WON'T FACE IS NOT COMPLETE"



SHOWN HERE IS OUR MODEL "D"

SIX SIZES AVAILABLE

RE-DESIGNED, MANY NEW FEATURES

ALL HAVE POWER FEED FOR FACING
WRITE TODAY FOR COMPLETE DETAILS

CHANDLER TOOL COMPANY, MUNCIE, IND.

COMBINED BORING & FACING TOOL HEADS

Chandler-Duplex

ACE SPECIALIZED DRILL BUSHINGS

for specialized jobs!

presents

4 New Standard Bushings, available in a wide range of dimensions for immediate, overnight delivery.

HEX-LOK®

SERRA-LOK®

DIAMOND-LOK®

SERRATED
For pressing into soft materials

For embedment in soft, castable and non-ferrous materials

ACE . . . first to offer a Complete Line of over 22,000 A. S. A. and ACE standard sizes, types and specifications in Drill Bushings, now presents

FOUR NEW MEMBERS

The exclusive 'grooved' design provides a torque-resisting withdrawal-defying 'locked-in-the-jig-plate' connection which, under normal use, will not pull or twist out.

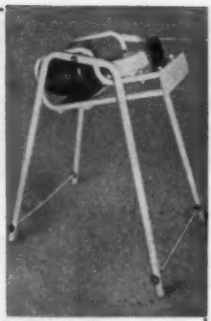
PAT. PENDING

ACE DRILL BUSHING CO., INC.
5407 Fountain Ave., Los Angeles 29, Calif.

Write for Free Catalog, Price Lists, Quantity Discount Schedules and Technical Data

NEW!

★ Heavy Duty Type
★ Jam-proof, Automatic
★ Portable Lightweight
★ Up to .050 Stock Capacity



Birtwell

SCRAP CHOPPER

Suspended to "float" freely . . . cannot cause any bow (back pressure) on outcoming waste stock from your press. Replaceable cutters. Light (50 lbs.) and compact, here is a portable unit that will get plenty of use in your shop!

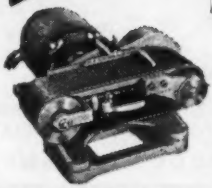
FREE BULLETIN . . . full information, prices. Write today! (Dealers: write for discounts.)

ONLY **$149.50** Complete

NORTHEASTERN
Development Engineers, Inc.
21 High Street
Pawtucket 5, R.I.

DOES IT BETTER
DOES IT FASTER

SIMPLEX-M
ABRASIVE BAND GRINDER



The precision of a machine tool plus the durability of a workhorse. Complete with ½ H.P. Heavy Duty Motor and automatic band tension control. Nothing like it for finishing metals, plastics, wood, fibre, etc.

OTHER STYLES AND SIZES IN NEW MANUAL ON FINISHING—WRITE TODAY

WALLS SALES CORP.
333 Nassau Avenue, Brooklyn 22, N. Y.

Specify **STANDARD**

• TAPER PINS • MACHINE KEYS
• WOODRUFF KEYS
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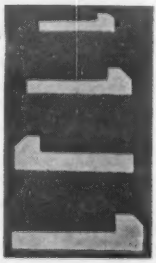

Yes, "Specify Standard" and you are certain of quality products to meet your production requirements. Your needs for the above items can best be served by Standard whose 2 plants (Beaver Falls, Pa. and Hammond, Indiana) are equipped to serve you. Write today for your free copy of Standard's catalog with specifications.

STANDARD STEEL SPECIALTY COMPANY
BEAVER FALLS PENNSYLVANIA

GRANT
RIVETERS..

PIONEERS and PACE-MAKERS in their line

—head rivets from smallest to ⅝" diameter either by NOISELESS SPINNING or VIBRATING HAMMER method—sizes to meet all needs—types include Vertical and Horizontal Multiple Spindles.

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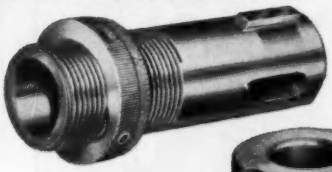
THE GRANT MFG. & MACHINE CO.
CE Station. Bridgeport 5, Conn.

For Unvarying ACCURACY...

Standardize on ECONOMY "TRU-LOC" Adjustable Adapters & Nut

- CONCENTRIC
- GROUND ACME THREADED BODY
- "TRU-LOC" NUT — Lock in Any Position
- WOODRUFF KEYWAY — Relieved

All items in stock — immediate delivery assured. Write for latest Bulletin and Price List.



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"TRU-LOC" Adapter Sleeves
A.S.A. Drill Jig Bushings
A.G.D. Plug & Ring Gages

Economy TOOL & MACHINE CO.
1824 S. 68th St. • Milwaukee 14, Wis.

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An Entirely New Model Optical Comparator Designed for 100% Production Inspection

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If you manufacture mass produced parts that are now being inspected or should be inspected on an Optical Comparator, the new Small Parts Comparator will enable you to inspect them quickly, accurately and economically at a surprisingly low per-piece inspection cost.

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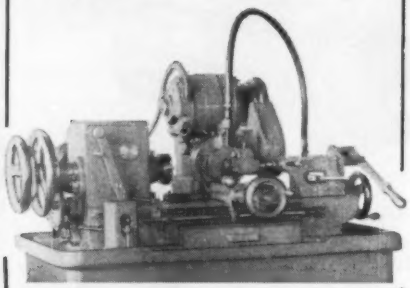


THREAD MILLING MACHINE

Ask for supplementary sheet describing the improvements and having an engraving showing the complete machine.

Write for Illustrated Bulletin

WALTHAM MACHINE WORKS
WALTHAM MASS.

MARK *and* DEMAGNETIZE
IN
ONE OPERATION

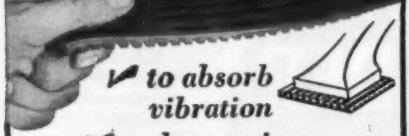
THE *Luma*
TOLEDO, OHIO
WAY

The Luma combination etchtool and demagnetizer etches, demagnetizes, anneals and solders. Permanently marks hardest steel with ease of a pencil.

Write for complete information.

Luma Electric Equipment Co.
P. O. BOX 132-H TOLEDO 1, OHIO

Put machines on ISOMODE® PADS



to absorb vibration
reduce noise
cut maintenance

Economical, effective mounting — 1 sq. ft. enough for 4 tons of machine weight. Neoprene — lasts for years. 5/16" thick, 18" square, ten to the standard package. Easily cut to shape and installed under most machines — big punch presses included. No cementing necessary. Write for Bulletin No. 415.

The **MB** Manufacturing Company, Inc.
1067 State Street, New Haven 11, Conn.

Greenerd
ARBOR PRESSES

For Assembling
Keyway Cutting
Broaching
Piercing
Oil Grooving
Straightening
Forming
Pressing
And many other jobs

65 Standard styles and sizes

From ¼ to 20 tons pressure for manually operated presses

From 1½ to 75 tons pressure for motor driven hydraulic presses

Originators of the Arbor Press

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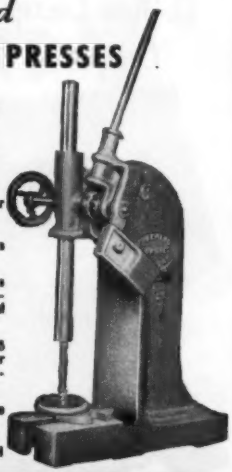
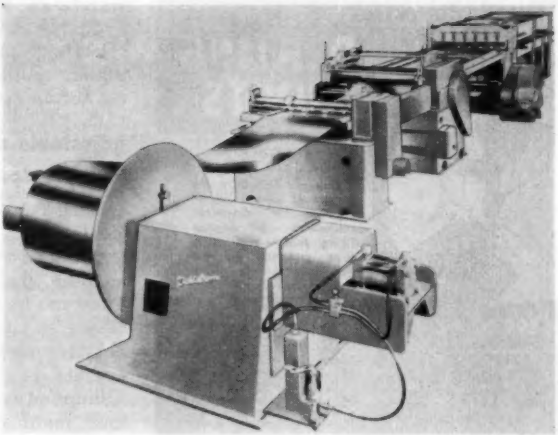


GREENERD ARBOR PRESS CO.
141 CROWN ST. • NASHUA, N.H.

Decoiling and shearing unit



Dahlstrom Machine Works, Inc., Dept. MB, 4227 W. Belmont Ave., Chicago 41, Ill., has developed a unit which permits the use of coiled material instead of flat stock. Dahlstrom's "Shear Line" consists of hydraulic expandable mandrel coil reel, roll straightener with all rolls power driven, hump table, high speed shear, conveyor type measuring and take-off unit.

Various operations are performed including decoiling, flattening, shearing and measuring the metal to desired length. Steel or aluminum of 12 gauge and lighter can be handled up to 72" wide. Lengths can be cut to specific requirements with tolerances of 1/32". A variable speed range gives from 50 to 150 f.p.m. The unit can be equipped for edge trimming as well.

Use ACTION Card, opposite page 64. Encircle No. 55

CONCENTRIC LIVE CENTERS the original, patented spring loaded live center

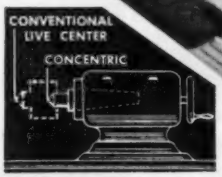
FASTER SPEEDS
AUTOMATIC THRUST ADJUSTMENT

Operates 4 to 5 times faster than ordinary live centers. Spring loaded spindle gives automatic tail stock adjustment.

LESS OVERHANG MEANS MORE RIGIDITY. . MORE WORKING RANGE

GREATER LOAD CAPACITY
LONGER LIFE
JAM PROOF

Write today for complete information



Pat No. 2,520,473

CONCENTRIC TOOL CORP 2486 Huntington Drive, San Marino, Calif

HEAVY DUTY - PRECISION BUILT
UNIVERSAL SERIES 1600
DRILLING UNITS

THE ONLY DRILLING UNIT
Offering a full 6" spindle travel with a capacity of 16" diameter workpiece—360 degree tilting table—and at a price matched by no other comparable piece of equipment.

$99.00 and Up

Dealer Inquiries Invited

FEATURES

- Full 6" Spindle Travel
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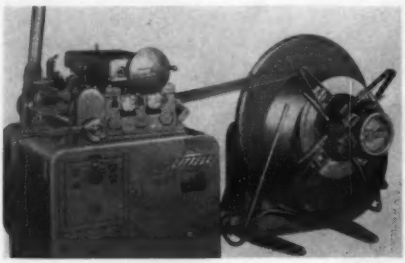
- Full 360 degree Tilting Table
- Built-In Heavy Duty Motor Switch
- Four Lifetime Lubricated Ball Bearings
- Micrometer Type Depth Stop
- Rugged Eye Appealing Construction
- Standard & Production Bench & Floor Models
- Single & Multiple Spindle

We also manufacture Gears, Coolant Systems and Dust Collectors—send for your complete catalogue now!

UNIVERSAL GEAR WORKS INC.
1307 East McNichols Road Detroit 3, Michigan

Hydraulic feeding, straightening machine

A hydraulically driven feeding and straightening machine, the 418-HRP, for converting a manually operated punch press to automatic operation has been announced by the F. J. Littell Machine Co., 4147 N. Ravenswood Ave., Chicago. Unit can be moved from one punch



press to another by means of a fork truck.

Machine will handle stock up to .125" thick. Three sizes of units having roll widths of 12½", 18½" and 24½" are available. A wide range of feeding speed selectivity properly synchronizes feeding and punching productions.

Use ACTION Card, opposite page 64. Encircle No. 63

Adjustable adapter shank for multiple spindle applications

Burg Tool Mfg. Co., Dept. B, P.O. Box 48, Gardena Sta., Gardena, Calif., has announced a complete line of adjustable adapter shank Toolflex tool holders. They can be furnished with Morse taper sleeve, straight bore or tap collets. Suitable for close center applications: can operate as close as ⅞" centers.

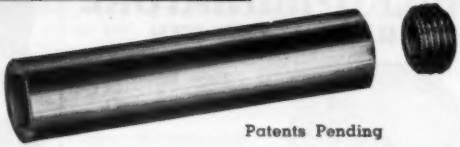
Simplicity of construction features only four main parts. Oil, heat and wear resistant Neoprene insert provides universal float that corrects for both parallel and angular misalignment, preventing bell mouthing and oversized holes or torn and oversized threads it is claimed.

Use ACTION Card, opposite page 64. Encircle No. 65

How SQUARE HOLED SLEEVES SPEED UP TOOL-MAKING!

One of the most difficult problems in tool making can be solved easily and quickly with Sturdy Square Holed Sleeves. The perfection of broached square holes can be had in boring bars, milling cutters and many other applications at a small fraction of the cost of imperfect hand-made square holes. The Sturdy Square Holed Sleeve consists of a round sleeve with a perfectly square hole broached through the center. This hole is tapped at one end to receive a back-up screw which is furnished with the Sleeve. The Sleeve can be sweated or pressed into a drilled and reamed hole to make a perfectly square accurate hole in a very few minutes.

The Sturdy Square Holed-Sleeve will save you many hours and many dollars in the making of boring bars, tool holders and other tools requiring square holes.



Patents Pending

SLEEVES MADE IN THE FOLLOWING SIZES:
3-16, 1-4, 5-16, 3-8, 7-16, 1-2, 5-8, 3-4, 1"

Write for Literature

STURDY BROACHING SERVICE
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COOLEY HEAT TREATING FURNACES

ELECTRIC BOX TYPE • FLOOR AND BENCH MODELS
For Tools and Small Parts

SHOWN HERE

THE COOLEY FLOOR MODEL
for *HARDENING AND TEMPERING*

Max. Temp.	Sizes	Price
2000°	12" x 8" x 18" 12" x 8" x 24" 12" x 8" x 36" 15" x 12" x 30"	$1030 to $1485

All prices are less controls. Any standard controls available for automatic temperature control.

- Cooley modern design provides natural convection—increases uniformity. Heavily insulated large area door makes for low heat loss—reduced power needs.
- Natural thermal convection.
- Easily removable heating elements.

Controlling Pyrometers carried in stock—available for all applications.

Free on request: ☐ COMPLETE CATALOG ☐ "SHOP NOTES ON HEAT TREATING"

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IN STUB LENGTH

When you think of small END MILLS — think of MICRO MINIATURES

Save Small End Mill Breakage

PRECISION GROUND FROM SOLID!

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1, 2½ and 5 lb. sizes—order your alloy lead hammer requirements from your machine tool supply house

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Carbide Rotary files—end mills—Reamers—milling cutters—counterbores, etc—carbide tipped micro-shavers

Special carbide tools manufactured to specifications

High speed steel counter sink cutters—rotary files, etc.

All high speed steel and carbide tools salvaged and resharpened.

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ROTARY FILE & TOOL CORP.
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Standardize on

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for **SPEED, ACCURACY, ECONOMY**

Automatic adjustment speeds up production in multiple operations with push-out type HALL COLLET CHUCKS. Full spindle capacity or over. Tremendous grip over or under stock size to .007—without adjustments. All grip ...no slip. No bearings...no heat or lost power. Instant release without stopping lathe.

SATISFACTION GUARANTEED!

Made in Two Sizes to Fit Your Requirements:
Model A...1" (max. capacity 1-1/16")
Model B...2" (max. capacity 2-1/16")

Round, square or hexagon collets, plain or serrated
No. 3 Collet Pads Now Available

Write today for illustrated catalog and price list—Dept. A-12

HALL MANUFACTURING COMPANY
622 TULAROSA DRIVE, LOS ANGELES 26, CALIFORNIA

for nut countersinking

Two KENT machines are available—the smaller for nuts up to 3/4" hexagon—the larger for nuts up to 1-7/16" hexagon.

Hopper fed. Duplicate work spindles countersink both sides of nuts simultaneously giving fast, economical production.

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The KENT MACHINE COMPANY

Cuyahoga Falls, O.

Drillers - Threaders - Slotters - Countersinkers
Bar Pointers

The "MASTER COMPAR"

INDICATING MICROMETER COMPARATOR

has the VISIBLE feel

No Arguments as to correctness of reading due to "feel".

Use it as Comparator, Master Micrometer, Go & No Go Gage.

1" Range reading in 1/10,000"

To attain permanent accuracy at these close limits, highest precision workmanship and exclusive design of mechanism are of Major importance and ONLY found in "MASTER COMPAR".

A RIGHT HAND TOOL

Release button for movable Anvils on RIGHT Hand side enables you to hold tool the conventional way.

NEW— Resetting to Zero in 5 seconds

Quick adjustable tolerance bands. Heavy TUNGSTEN CARBIDE Anvils will actually measure Out-of-Roundness, Ovalness and Taper.

0-1" SIZE IN HARDWOOD CASE

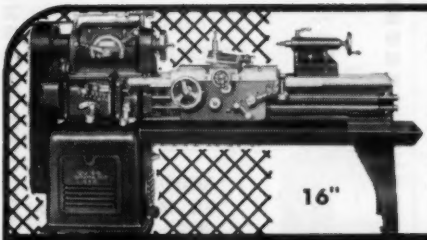
$95.00

Also Available in LARGER SIZES

Ask for Illustrated Circular — Code GIOFF

Sold thru Tool Supply Houses
Ask for Demonstration

GEORGE SCHERR CO., INC. 200-MT LAFAYETTE STREET • NEW YORK 12, N.Y.



CARROLL AND JAMIESON LATHES

• This 16" lathe is equipped with 12 speed geared head, motor drive, and Timken mounted spindle. It's modern in design — with liberal dimensions.

Write today for descriptive bulletin.

THE CARROLL & JAMIESON MACHINE TOOL CO. BATAVIA, OHIO, U.S.A.

CLOSED

TRADE AUTOM MARK

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Plain Type

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CONTINUOUS HINGES

All hinges shown can be furnished with special holes, cutouts and bends to blue-print in metals to suit the job.

THREE-FOURTHS OFFSET

AUTO MOULDING & MFG. CO.
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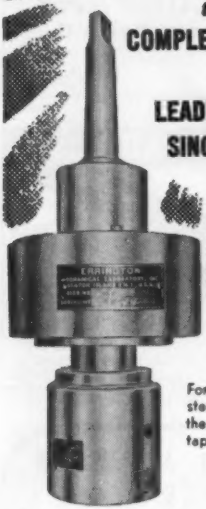
CHICAGO 19, ILL.

SPECIFICATIONS:
Open width 7/8" to 6"
Gage Material .040 to .125
Pin Diameter .101 to 3/8
Lengths to 120"

SEMI-OFFSET

ERRINGTON TAPPERS . . .

the COMPLETE LINE . . .
the LEADING LINE SINCE 1891



FRICTION

For blind holes, tapping in steel, copper, etc. wherever there is danger of breaking taps.

Errington specializes in the manufacture of high speed multiple drilling and tapping attachments. The name Errington is your assurance of top-quality products . . . your assurance of the finest and most modern tools to produce first-grade workmanship at minimum operating costs.

QUICK-CHANGE

Tool-Holders to Drill, Tap and Set Studs, etc., without moving work, or stopping or reversing machine. Individual friction adjustment in each tap-holder, if required.

POSITIVE

For through holes where work is drilled and then re-handled and tapped.

BALL BEARING CONE-DRIVE

Designed for Ball Bearing High Speed Drill Press.

These Tappers may also be adapted for button or acorn die threading.

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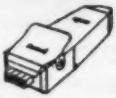
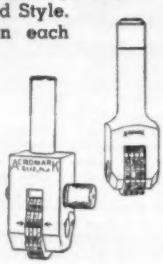
HERCULES
REG. U. S. PAT. OFF.
HOLDERS

AND SHOULDER STYLE STEEL TYPE FOR NUMBERING



Model HN Numbering Machines—Hand Style. All numbers on each wheel.



SPEED Model Numbering Machines for consecutive or random numbering in a press.

ACROMARKER Name-Plate stamping machines are made in several models and sizes for hand or foot operation.

ACROMARK Series 9A Marking Machines are widely used for product marking. Adaptable to marking tools and other items.

Write for latest literature and prices

The ACROMARK Company
15 Morrell St.
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"The Original Marking Specialists"

Sensational new
VIBRA-FORGE* principle assures unbreakable welds every time!

BREN-WELD

PORTABLE BAND SAW BLADE
WELDER
...With Built-in Grinder
3/4" capacity

If you've been troubled with band saw blade breakage investigate this Bren/Weld unit built on the new Vibra-Forge principle. It gives you:

- PERFECT WELDS.
- NO BREAKAGE.
- NO FAILURES.
- WEIGHS ONLY 35 LBS.
- OPERATES ON 110 V. AC.
- UNCONDITIONALLY GUARANTEED.

LIST $169.50 PRICE

Write today for complete details

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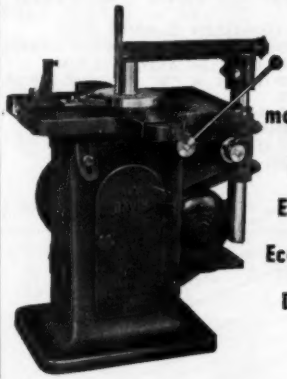
SALES DIVISION
KASSON DIE & MOTOR CORP.
Integrity Since 1919
32-14 Northern Blvd., Long Island City 1, N.Y.

"DAVIS" KEYSEATERS



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Efficient
Economical
Durable

Built in 3 sizes for cutting keyways 1/16" to 1" width. Circular upon request.

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Rivet Spinning
on the
LINLEY
is fast, low in cost and noiseless

Save time and money by putting your riveting on the LINLEY RIVETER. Send us samples of your work and we'll gladly and without obligation give you estimates on the time and cost of handling your work the LINLEY way.
Available in sizes and types for iron and cold rolled steel rivets up to ⅝"; larger rivets of softer materials can also be handled.

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20 TO 200 D.P.
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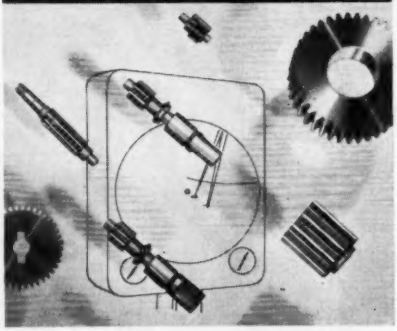

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STRAIGHT BEVELS • LEAD SCREWS • RATCHETS
CLUSTER GEARS • RACKS • INTERNALS • ODD SHAPES

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Beaver Gear Works Inc.
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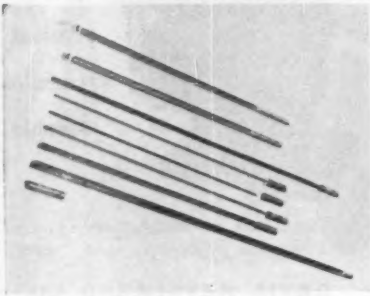
Deep Hole Drills

- SOLID TUNGSTEN CARBIDE TIPS
- CARBIDE INSERTS WITH WEAR STRIPS
- SHANKS OF 4130 ALLOY TUBING ROLLED WITH A "V" GROOVE OR A RADIUS
- SHANK HOLDERS TO FIT YOUR MACHINE
- SHANK SECOND FROM LEFT HAS GREATER CHIP REMOVAL AREA

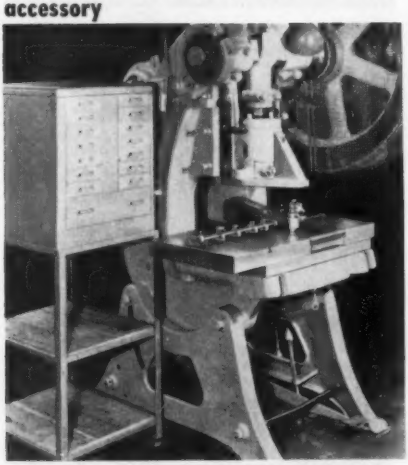


Send Prints for Quotations

Barnard Manufacturing Co.

520 Boston Post Road Milford, Conn.

Press punching and gaging accessory



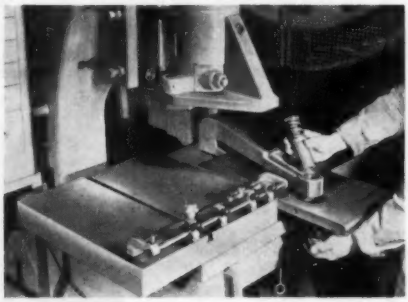
1. The Wales press punching and gaging assembly on the press bed and the combination auxiliary cabinet and tool rack at the side of the press.

Announcement of the Quick-Change press punching and gaging accessory, known as the "PPG group," has been made by the Wales-Strippit Corp., 396 Payne Ave., No. Tonawanda, N.Y.

Accessory converts open back press into a hole punching machine with 20-second punch and die change. Entire assembly is placed on the press bed. Nothing is attached to press ram. The only function of the ram is to depress the punch.

The PPG group consists of a steel bedplate, Quick-Change holder 18" back gage bar, 18" stop support rail and combination auxiliary cabinet and tool rack. The 14 drawers in the auxiliary cabinet hold a complete range of graduated punch and die sizes from 3/32" to 1¼" dia. The full width lower drawer and 2-shelf tool rack provide storage for additional tooling.

Use ACTION Card, opposite page 64. Encircle No. 46



2. Removing punch and die from the Quick-Change holder.

To manufacture plug gages

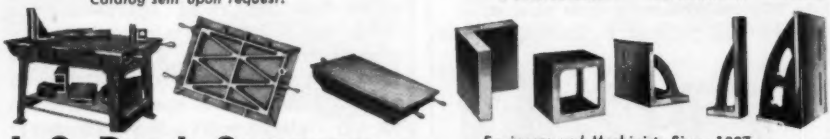
DeKalb Precision Industries Dept. B, Waterman, Ill., has begun manufacture of precision plug gages and allied products. Product distribution and sales are being organized for national coverage.

Use ACTION Card, opposite page 64. Encircle No. 61

MILWAUKEE *Precision* EQUIPMENT

Designed and finished for true dimensional accuracy. Highest grade semi-steel.
Catalog sent upon request.

SURFACE PLATES — ANGLES — PARALLELS — STRAIGHT EDGES



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Engineers and Machinists Since 1907
165 S. BARCLAY STREET — MILWAUKEE 4, WIS.

Multiple Spindle Magazine Feed Power Screw Driving Machines

Latest type equipment for driving screws faster in products requiring two or more screws. These machines operate easily and require very little attention or adjustment once they are put in production.

Part Feeder

Automatic Part Feeders are adaptable to production jobs requiring the handling of small parts. Parts poured into hopper are arranged and fed down track in proper order. Send sample parts when writing for quotation.

COOK & CHICK CO.
2415 WEST 24th ST.
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D & M AUTOMATIC PUNCH PRESS GUARD

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•
$28.00 TO $36.00 F.O.B. BUFFALO, N.Y.
•
Low Maintenance

• This punch press guard meets the most exacting standards of safety engineers and safety laws. Permits operator to feed the press without hindrance. *Write for complete information.*

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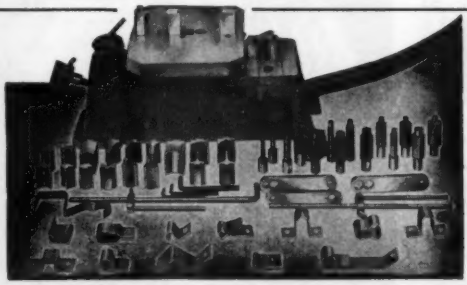


Multiform BENDER-CUTTER

CUTS, BENDS, PUNCHES

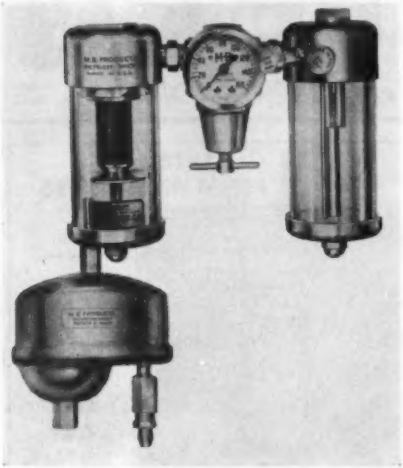
Available in hand or air operated models, the MULTIFORM is shipped complete with full assortment of dies and mandrels to punch, bend and cut round or flat brass, bronze, aluminum, steel, etc., up to ⅜" x 1½" as illustrated, other models up to ¼" x 4".

J. A. RICHARDS CO.
KALAMAZOO, MICH.

Automatic air trap

M-B Products, Dept. BB, 46 Victor Ave., Detroit 3, Mich., features an automatic air trap, a water ejector for air line applications.

Device is claimed to assure dry air



in pneumatic systems regardless of humidity or other contributing factors. Trap weighs less than five pounds, an important factor due to the trend to plastic or transparent filter bodies.

Use ACTION Card, opposite page 64. Encircle No. 47

Turret drive converts lathes to semi-automatics

A new method of converting self-indexing ram-type turret lathes to semi-automatics has been announced by the Kwick Tool and Manufacturing Co., Dept. B, 201 Sexton Bldg., Minneapolis.

Production can be increased from 20 to 300 per cent where runs of over 300 pieces are common, it is claimed.

Tolerances of ± .001 are constantly maintained. Even closer tolerances can be obtained by use of a by-pass valve and handwheel in conjunction with an indicator, included with the conversion unit. Number 3 threads are maintained for taps and dieheads, and the equivalent of ground finishes can be obtained by infinite hydraulic feed selections.

The conversion unit gives these automatic features: rapid approach at a maximum of 330″ per minute; infinitely adjustable feed from 0″ to 120″ per minute on each station; individual dwell control with optional operator selection for any stations, with a 15 second maximum dwell; quick return and controllable index, with no interruption of the cycle unless the operator desires cycle stops in any station.

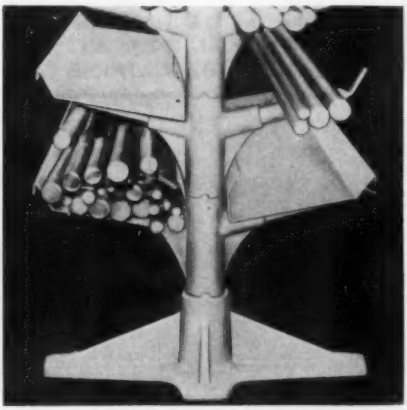
Use ACTION Card, opposite page 64. Encircle No. 48

Stock trays simplify storage of bar & tube remnants

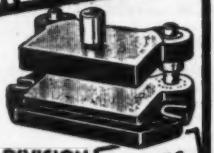
As an accessory to Brown Quick-Serve sectional stock racks for bar, rod, tube, pipe, or strip, stock trays are said to be useful for storing miscellaneous stock items too short or too "whippy" to span two regularly-spaced racks. The tray does not interfere with regular long-length racking on the same arms.

Five inches deep and in four standard widths, units are available in 4′, 6′, or 8′ span. Brown Engineering Co., 111 N. Third St., Reading, Pa.

Use ACTION Card, opposite page 64. Encircle No. 49



DANNEMAN *Precision* DIE-SETS



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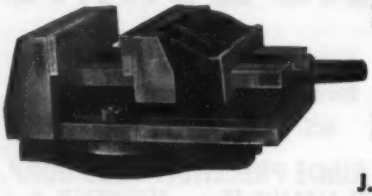

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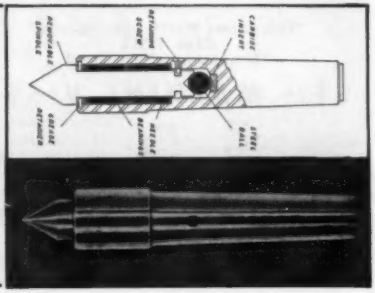

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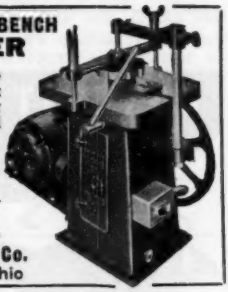

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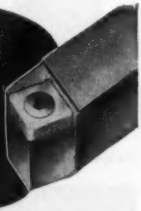

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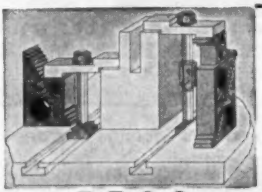

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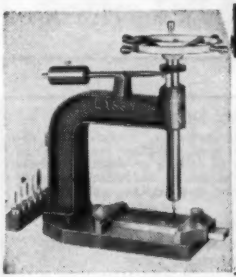

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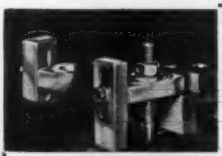

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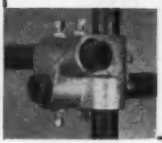

with Amidon Fittings and one inch pipe.

Amidon Engineering Co.
ELYRIA 10, OHIO

Clamping fixture cylinder with non-rotating piston rod

The Beckett-Harcum Co., Dept. MTB, 1087 Wayne Rd., Wilmington, Ohio, is now manufacturing the "No-Ro-Fix" square rod clamping fixture cylinder which is claimed to save time and expense for shops that design their own guide rods for small clamping and locating fixtures. The cylinder is supplied with a 1" bore, having a ⅛" pipe thread air connection, in 1", 2", 3" and 4" strokes, with spring return. Larger bore square rod cylinders are available.

Compact and heavy-duty construction, with few component parts. The piston rod is supported by an oversize bronze bearing. Seal is by standard O ring.

Use ACTION Card, opposite page 64. Encircle No. 59

Work support for o.d. grinding

The Gray-Grimes Steady-Rest was recently introduced by Last Word Sales Co., 18502 Mt. Elliott, Detroit 34, Mich.

Designed to be used as a work support in o.d. grinding operations, it is reported to maintain equal support of the workpieces regardless of length while permitting grinding wheel to pass back and forth without stopping. It automatically compensates for stock that is ground off the workpiece, without making it necessary to true up a spot for the shoe. Constant pressure against the workpiece is maintained by a V-shaped shoe which is controlled by a cam, actuated by a counterweight.

Unit is available in three models, for universal grinders having 5" to 6" center height, for universal grinders having 6" to 7½" center height, and for No. 13 universal B and S grinders.

Use ACTION Card, opposite page 64. Encircle No. 60

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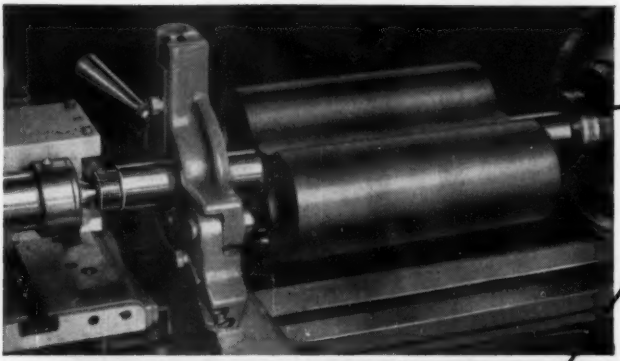

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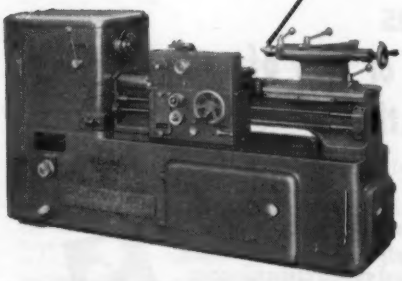

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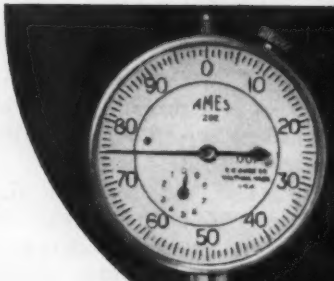

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PRODUCTS INDEX

A

Abrasive Belt Machines, 324
Abrasive Cloth, Paper, Discs, Wheels, Stones, Belts, etc. 42, 73
Adapters, 30, 325
Air Tools, 231, 331
Air Traps, 315
Alloys, 40-41, 207
Angle Bending rolls, 292
Angle Tools, 282
Angles, 335
Arbors, 30

B

Bar Equipment, 195
Bars, 25, 195, 207
Bedways, 190
Benches, work, 274
Bending Equipment, 54, 110, 202, 335
Blades, hack saw, 215
Blanks, circular form tools, 195
Bolts, coupling, 320
Boring Heads, 16-17, 294
Boring Machines, 185
Boring Tools, 277
Boxes, 290
Brakes, press, bending, 38-39
Broach, carbide insert, 28-29
Buffing Machines, 138
Burrs, 68
Bushings, 81, 262, 310, 323, 338
Bushings, drill jig, 81, 323, 337, 338

C

Cam Milling, 337, 339
Cams, 255
Carbide Stock, 311
Carbide Tools, 28, 29, 57, 226, 229, 304, 329, 339
Centers, bullnose, 287
Centers, Carbide-Tipped, 287
Centers, live, 211, 268, 298, 305, 309, 312, 327, 338
Centers, precision, 287
Chucks, 241
Chucks, collet, 208, 329
Chucks, boring, 317
Chucks, magnetic, 337
Chucks, quick-change, 30
Clamps, 339, 340
Clamps, fixture, 217
Clamps, strap, 4
Clamps, T-slot, 4
Clutches, 86, 347
Collars, spacing, 30
Collet Controller, 1
Collets, 180, 259
Comparators, dial, 171, 331
Comparators, optical, 325
Control, Tool unit, 63
Coolants, 84, 252
Coolant Cleaners, 84
Coolant Systems, 226
Counterbores, 57
Countersinks, 57, 331, 353
Cut-off Machines, 76, 220
Cut-off Wheels, 178, 179, 222
Cutters, 87, 335
Cutters, Arbor, 16-17
Cutting Fluid, Oils, 14, 187
Cutting Machine, Abrasive, 45
Cutting Wheels, 73
Cutting Tools, 18-19, 329
Cylinders, hydraulic, pneumatic, 251, 261, 293

D

Deburring Machines, Tools, 353
Dial Indicators, 221, 344
Diamond Abrasives, 285
Diamond Dressers, 293
Diamond Tools, 293

PRODUCTS INDEX

Diamond Wheels, 293
Diamonds, industrial, 12-13
Die Making Machines, 31
Die Heads, 35
Die Sets, 106, 337
Die Set Service, 23
Die Stock, 55, 280-281
Dies, 90, 104, 299, 303, 351
Dies, progressive, 303, 320
Die-Tool Service, 320
Dividing Heads, 99
Dressers, tool 12-13
Drill Guides, 337
Drill Heads, 70, 298, 203
Drill Press, 46
Drill Repairing Service, 300
Drilling Attachments, 256
Drilling Attachments, multiple spindle, 71
Drilling Machines, 44, 331
Drilling Machines, bench, 204
Drilling Machines, hydraulic ram, 44
Drilling Machines, pedestal, 357
Drilling Machines, precision, 133, 204
Drilling Machines, radial, 43, 88, 267
Drilling Units, 64, 282, 328
Drills, 57
Drills, deep hole, 331
Drills, high speed, 202
Drills, micro, 202
Drills, twist, 169
Drivers, tap, 30
Drives, variable speed, 260
Duplicating Attachments, 175, 322
Duplicator Table, 319
Dust Control, 7, 210
Dye, layout, 309, 340

E

End Mills, 16-17, 87, 329,back cover,
End Mills, Tools, 165
Engravers, 65

F

Face Mills, 16-17
Facing Heads, 323
Facing Tools, 310, 323
Feeder parts, 301, 335
Feeds, roll, 224, 357
Feeler Gage Stock, 310
Files, 139, 353
Finishing Machines, 234
Fixtures, 217
Flat Ground die steel, 55
Flat Stock, ground, 215
Flexible Shaft Machines, 53
Forming Machines, 290
Fullers Earth, 312
Furnaces, electric, 247, 270, 297
Furnaces, heat-treating, 278, 283, 297, 306
Furnaces, industrial, 297

G

Gage Blocks, 32, 271
Gage Blocks, carbide, 32
Gages, 51, 232, 250, 331
Gages, dial, 171
Gages, dial bore, 316
Gages, height, 295
Gages, internal, 51
Geges, micrometer, 295
Gages, plug, 271
Gages, spline, 99
Gages, thread, 51
Gear Cutters, 235
Gear Cutting Machines, 177
Gear Measuring Equipment, 99, 271
Gear Pumps, 99
Gear Shapers, 36-37
Gears, 99
Gears, helical, 177, 333
Gears, worm, 333
Grinders, 66-67, 313, 234
Grinders, automatic drill, 31
Grinders, abrasive belt, 324
Grinders, air, 33, 231
Grinders, bench, 205
Grinders, carbide tool, 246
Grinders, combination, 284
Grinders, cylindrical, 275
Grinders, disc, 138
Grinders, external, 61
Grinders, face mill, 31
Grinders, internal, 61, 275
Grinders, jig, 79
Grinders, pedestal, 234, 246
Grinders, precision, 214
Grinders, sharpening, 284
Grinders, surface, 205, 214, 275
Grinders, tap, 290
Grinders, template tool, 31
Grinders, tool & cutter, 30, 275
Grinders, vertical air, 33
Grinding Attachments, 47, 59, 209
Grinding Fixture, 59
Grinding Heads, 22
Grinding Wheels, 175, 243
Guards, punch press, 335

H

Hammer moulds, 329
Hammers, handles, 329

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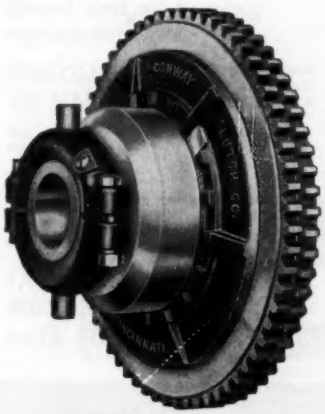

Model 222G
gear tooth drive
triple plate mechanism

Hammers, soft-faced, 218
Hardness Testing Equipment, 85, 337
Hinges, 331
Hobbing Machines, 135
Holders, drill, tap, reamer, 189, 321
Holders, floating drill, 189
Holders, tool, 258
Honing Fixtures, 360
Honing Machines, 360
Honing Tools, 360

I

Index Base, 308
Index Units, 282
Inserted blade, 16-17
Inspection & Measuring devices, 36-37, 221
Inspection Units, 171
Installations, 10

J

Jacks, 4
Jig Borers, 79
Jig Boring, 337
Jig Grinders, 79

K

Keys, woodruff, 324
Keyseaters, 333, 339
Keyseat Cutters, 290

L

Lapping Equipment Compounds, 24, 66-67
Lapping Machines, 359
Lathe Attachments, 225
Lathes, 60, 93
Lathes, automatic, 193
Lathes, bench, 2, 318
Lathes, subheating, Inside Back Cover
Lathes, floor, 140-141
Lathes, general purpose, 140-141
Lathes, precision, 77, 238
Lathes, tool, gage-makers, 2, 140-141
Lathes, turret, 149
Lathes, vertical turret, 185
Layout Fluid, 309, 340
Leasing, 10
Lighting Equipment, 206
Lubricants, 319
Lubricators, fog, 157

M

Machine Keys, 324
Machine Racks, 324
Marking Equipment, 326
Marking Machines, 332
Micrometers, 268, 271, 331
Micrometers, lightwave, 271
Milling Cutters, 16-17, 87, 282
Milling Cutters, carbide, 28-29, 282
Milling Heads, 34
Milling Machine Attachments, 60
Milling Machines, 3, 8-9, 94, 223, 340
Milling Machines, horizontal, 265
Milling Machines, vertical, 265
Mills, midget, 353
Motors, electric, 50
Mounting Pads, 257, 326

N

Nibbling Machines, 45, 290
Notching Equipment, 302
Numbering Machines, 62, 321
Nuts, 279, 325
Nuts, adjustable adapter, 279

O

Optical Flats, 271

P

Pantographs, 65
Partitions, 358
Partitions, wire mesh, 358
Planers, 11
Planers, milling type, 11
Plastic Tools, 219
Plates, 207
Portable Electric Tools, 258
Porting Tools, 254
Press Brakes, 38-39, 314
Presses, 20, 80, 213, 273
Presses, air, 236
Presses, arbor, 326
Presses, automatic, 48-49
Presses, combination, 273
Presses, deep-throat, 288, 355
Presses, draw, 304
Presses, drill, 267
Presses, horn, 288

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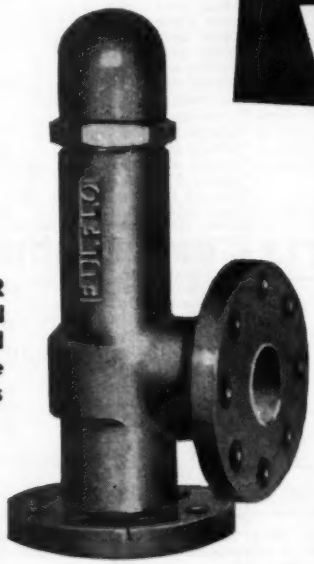

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Presses, hydraulic, 72
Presses, O.B.I., 288
Presses, power, 183
Presses, punch, 304, 310, 355
Presses, straightening, 27
Profiling Machines, 2
Pumps, coolant & lubricant, 228
Punches, 245, 299, 335
Punch & Copers, 56
Punch Press Guards, 335
Punching Equipment, 248-249
Pyrometers, 297

R

Racks, 333, 340
Reamers, 57, 307, 353
Recessing Tools, 30
Regrinding Service, 353
Rivet Setters, 58, 324
Riveting Machines, 58, 333

S

Saw Blades, 272
Saw Blades, band, 215
Saw Blades, hack, 272
Sawing Machines, 237
Sawing Machines, band, 242, 276
Sawing Machines, cut-off, 237
Sawing Machines, friction, 56
Sawing Machines, hack, Inside Front Cover
Sawing Machines, table, 302
Saws, circular, 199
Saws, metal-cutting, 199, Inside Front Cover
Scrap Cutters, 324
Scrapers, hand, 341
Screw Driver, 289
Screw Drivers, power, 289
Screw Machine, driving 335
Screw Machine Attachments, 15
Screw Machines, automatic, 216
Screw Machines, hand, 2
Screws, head, 333
Screws, 320
Screw Sets, 320
Screw Sets, transfer, 338
Screws, cap, set, socket & machine, 74-75, 319
Shank, 287
Shapers, 38-39, 140-141, 253
Shaving Machines, 36-37
Shearing Machines, 20, 38, 39, 56
Shears, hand, 339
Shears, power squaring, 21
Shears, throatless, 300
Sheets, 207
Sheets, steel, 207
Shop Equipment, 290
Sleeves, 297
Slitting Cutters, 300
Slotters, 300, 331
Socket Screw Products, 74-75
Special Machinery, 290-291
Spindles, 150, 209
Square Hole Drills, 337
Stampings, 104, 341
Steel Bars, hollow, 25
Steel and Steel Stock, 40-41, 114, 207
Steels, Tool 280-281
Stop Blocks, 339
Stop, precision, 314
Straight Edges, 335
Structural shapes, 207
Stud Extractors, 258
Studs, 320
Superfinishers, 227
Surface Plates, 335
Swaging Machines, 160

T

T-Bolts, 4
T-Slot Bolts, 4
T-Slot Clamp, 4
Tables, elevating, adjustable, 137, 295
Tables, rotary, index, 24
Tap Drivers, 30
Tap Extractors, 258
Tap Units, 282
Taper Pins, 324
Tappers, 332
Tappers, hand, 339
Tapping Attachments, 78
Tapping Machines, 266
Taps, 82-83, 351
Thread Grinding, 108
Thread Milling Machines, 3, 326
Threading Machines, 108, 343, 357
Tool Bits, 282
Tool Control Unit, 63
Tool Cribs, 358
Tool Steels, 280-281
Tools, 40-41
Tools, forming, 12-13
Tracer Controlled Equipment, 113, 322
Traps, steam & air, 315

V

Valves, 315, 349
Valves, air, 102
Vises, 321
Vises, angle, 339
Vises, drill press, 212
Vise, milling machine, 338, 339
Vises, machine, 337

W

Welding Equipment & Supplies, 333
Wheel Dressers, 99
Wrenches, automatic, 269

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6	36-40-48-56-60
7	32-40
8	24-30-36-38-40-44-48
9	24-28-32-40
10	28-30-36-40-48-64
12	20-28-32-36
14	20-24-28
1/16	60-64
5/64	72
3/32	48
7/64	48-56
1/8	32-40
5/32	32-36-40
9/64	36-40
11/64	36
3/16	20-24-32
13/64	32
7/32	24-28-32
1/4	18-24-26-27-30-32-36-40
5/16	16-20-22-27-28-32-40
3/8	12-16-18-20-27-28-32-36-40-48
7/16	12-16-18-22-24-27-28-30-32-36-40
1/2	12-14-16-18-22-24-26-27-28-30-32-40
9/16	16-20-24-27-28-30-32-40-48
5/8	12-14-16-20-24-27-28-32-36-40
11/16	11-16-18-20-24-27-28-30-32
3/4	9-11-12-14-18-20-24-26-27-28-32
13/16	10-14-18-20-32
7/8	10-12-16-18-20-24-27-28-32
15/16	8-9-10-12 4-16-18-20-24-32
1	10-12-16-18-20-24-27-32-40
1-1/16	12-14-16-18-20-24
1-1/8	8-10-14-16-18-20-24-32
1-3/16	8-10-12-14-16-18-20-24
1-1/4	8-10-14-16-18-20-24-32
1-5/16	12-14-16-18-20-24-32
1-3/8	8-10-14-16-18-20-24
1-7/16	8-10-12-16-18-20-24
1-1/2	8-10-14-16-18-20-24-28
1-9/16	18-20-24
1-5/8	5½-8-10-12-13-16-18-20-24
1-11/16	10-12-14-16-18-20-24
1-3/4	8-10-12-14-16-18-20-24
1-13/16	8-10-12-14-16-18-20
1-7/8	8-10-12-14-16-18-20-24
1-15/16	8-10-12-14-16-18-20-24-28
2	4-½-8-10-12-16-18-20
2-1/16	12-14
2-1/8	12-16-20
2-3/16	12-16
2-1/4	4-½-8-12-14-16-18
2-5/16	12-18
2-3/8	12-16-18
2-1/2	8-10-12
2-9/16	18
2-5/8	12-16-20
2-3/4	16
2-7/8	8-12-16
3	8-16
3-1/4	8-12-16
3-1/2	8-12-16
3-7/8	6
4	8-12

HIGH SPEED LEFT HAND TAPS

SIZE	THREAD
0	80
1	56-64-72
2	56-64
3	56
4	32-36-40-48
5	40-44
6	32-36-40
8	32-36-40
10	24-30-32-40
12	24-28-32
1/4	20-28-32
5/16	18-20-24-28-32
3/8	16-24-32
7/16	14-20-28
1/2	12-13-20-28
9/16	12-18-20-24
5/8	11-12-18-20-24
11/16	11-16-24
3/4	10-16-18-20
13/16	16
7/8	9-12-14-18-20
1	8-12-14-16-18-20
1-1/8	7-12
1-1/4	7-12-16-18
1-3/8	6-8-10-12-16-18-20-24
1-7/16	8-10-12-14-16-18-20
1-1/2	6-8-10-12-16-18-20
1-9/16	8-10-12-16-18-20
1-5/8	8-10-12-14-16-18-20
1-11/16	8-10-12-14-16-18-20
1-3/4	8-10-12-14-16-18-20
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Index to Advertisers

A

Ace Abrasive Laboratories 285
Ace Drill Bushing Company 323
Acme Danneman Company, Inc. 337
(Danneman Die Set Div.)
Acme Tool Company 258
Acme Wire & Iron Works 358
Acromark Company 332
Aget Manufacturing Company 210
Alina Corporation 288
Alleghany Ludlum Steel Corporation ..280-281
Allen Industries, Alva F. 310
Allied Products Corporation 245
Allison Company 73
American Chain & Cable Company 45
(Campbell Machine Division)
American Chain & Cable Company 85
(Wilson Mechanical Division)
American Drill Bushing Company 81
American Gage & Machine Company 213
American Saw & Manufacturing Co. 215
American Tool Works Company
.....Inside Back Cover
Ames Company, B. C. 344
Amidon Engineering Company 340
Anderson Bros. Manufacturing Company ..254
Apex Machine & Tool Company 289
Apex Tool & Cutter Company 282
Armstrong-Blum Mfg. Co. ..Inside Front Cover
Armstrong Brothers Tool Company 4
Aro Equipment Corporation 313
Arter Grinding Machine Company 275
Auto Moulding and Manufacturing Co. ..331

B

Baker and Company, Inc. 306
Balas Collet Manufacturing Company 180
Baldor Electric Company 246
Barber-Colman Company 140-141
(Hendey Machine Div.)
Barnard Manufacturing Company 334
Barnes Drill Company 84
Bay Products, Inc. 290
Beaver Gear Works, Inc. 333
Bellows Company 1
Benchmaster Manufacturing Company 355
Beverly Shear Manufacturing Company ..300
Blanchard Machine Company 243
Boggis & Company, Henry P. 290
Bremil Manufacturing Company 339
Brightboy Industrial Division 42
(Weldon Roberts Rubber Co.)
Brown Corporation, W. R. 236
Bryant Chucking Grinder Company 51
Buffalo Forge Company 357
Bullard Company 185
Busch Company, J. C. 335

C

Carborundum Company 178-179
Carey-McFall Company 311
Carroll & Jamieson Machine Tool Co. 331
Carter Controls, Inc. 298
Challenge Machinery Company 274
Chandler Tool Company 323
Chicago Latrobe 57
Chicago Mfg. & Distributing Company 319
Chicago Quadrill Company 256
Chicago Rawhide Manufacturing Co. 218
Chicago Rivet & Machine Company 58
Chicago Tool & Engineering Company 339
Cincool Division 187
(Cincinnati Milling Machine Company)
Cincinnati Bickford Tool Company 88
Cincinnati Milling Machine Co. 8-9
Cincinnati Milling Products Division 175
(Cincinnati Milling Machine Company)
Cincinnati Shaper Company 38-39
Circular Tool Company 199
Cleveland Instrument Company 295
Clipper Diamond Tool Company 293
Columbus Die-Tool and Machine Co. 320
Concentric Tool Corporation 327
Conical Tool Company 308
Continental Tool Works 262
(Division Ex-Cell-O Corporation)
Conway Clutch Company 347
Cook & Chick Company 335
Cook & Sons, Inc., Phillip 232
Cooley Electric Manufacturing Corp. 329
Crane Packing Company 359
Criterion Machine Works 277
Cross & Son, Herbert 338
Cross Company 63-177
Crucible Steel Company of America 25

D

D & M Guard Company 335
Dake Engine Company 72
Dakon Tool & Machine Company 211
Danly Machine Specialties, Incorporated .. 23
Danneman Die Set Div. 337
(Acme Danneman Co.)
Davis Boring Tool Division 195
(Giddings & Lewis Machine Tool Co.)
Davis Keyseater Company 333
Dayton Rogers Manufacturing Co. 340-341
Derbyshire, Inc., F. W. 77
Detroit Die Set Corporation 106
Detroit Stamping Company 310
De Vlieg Machine Company 94
Dreis & Krump Manufacturing Co. 314
Dykem Company 318

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E

Economy Tool and Machine Company 325
Eisler Engineering Company, Incorp. 255
Electro-Mechano Company 64
Empire Tool Company 189
Errington Mech. Laboratories 332
Essex Rotary File & Tool Corporation 330
Ex-Cell-O Corporation 262
(Continental Tool Works Div.)

F

Fairfield Gauge Company 295
Falls Products, Inc. 268
Fellows Gear Shaper Company 36-37
Felters Company 257
Fen Machine Company 269
Firth-Sterling, Inc. 40-41
Flynn Manufacturing Company 294
Fostoria Pressed Steel Corporation 206
Franklin Balmar Corporation 53
(N. A. Strand Division)
Fulflo Specialties Company, Inc. 349
Fulmer Company, C. Allen 360

G

Galland-Henning Nopak 251
Gammons-Hoaglund Company 307
Gatco Rotary Bushing Company 310
Giddings & Lewis Machine Tool Co. 195
(Davis Boring Tool Division)
Gisholt Machine Company 149-227
Glenzer Company, J. C. 279
Gorton Machine Company, George 113
Gottschalk Company, Inc., Ernest 267
Grant Manufacturing & Machine Co. 324
Gray Company, G. A. 11
Green Instrument Company 65
Greenerd Arbor Press Company 326

H

Hall Manufacturing Company 330
Hamilton Tool Company 133-135-137
Hammond Machinery Builders 7
Hardinge Brothers, Inc. 3
Hariq Manufacturing Corporation 47
Hause Engineering Company 52
Heimann Manufacturing Company 338
Heinrich Tools, Inc. 212
Hendey Machine Division 140-141
(Barber-Colman Company)
Hendley and Whittemore Company 292
Hersen Chemical Company 252
Himoff Machine Company 337
Huppert Company, K. H. 283

I

Index Machine Company 265
Ingersoll Milling Machine Company 16-17

J

Jacobs Manufacturing Company 208
Jahn Manufacturing Company, B. 303
Jentsch, Inc., Edward 314
Johnson Gas Appliance Company 278
Johnson Machine & Press Corporation 304
Johnson Manufacturing Corporation 220
Jones & Lamson Machine Company 35

K

Kalamazoo Tank & Silo Company 276
(Machine Tool Division)
Kalins and Company, J. M. 319
Kasson Die & Motor Corporation 259-333
Kaufman Manufacturing Company 266
Kaukauna Machine Corporation 43
Kennametal, Inc. 339
Kent Machine Company 331
Kent-Owens Machine Company 223
Kidde Prec. Tool Corporation 337-339
King, Andrew 337
Kitzman Manufacturing Company 330
Kling Brothers Engineering Works 56

L

L & J Press Corporation 80
L-W Chuck Company 337
Lamina Dies & Tools, Inc. 104
Landis Machine Company 108
Lassy Tool Company 339
Lees-Bradner Company 343
Lehigh Foundries 322
Lempco Products, Inc. 27
Levin & Son, Louis 202
Linley Brothers Company 333
Lucifer Furnaces, Inc. 270
Luma Electric Equipment Company 326

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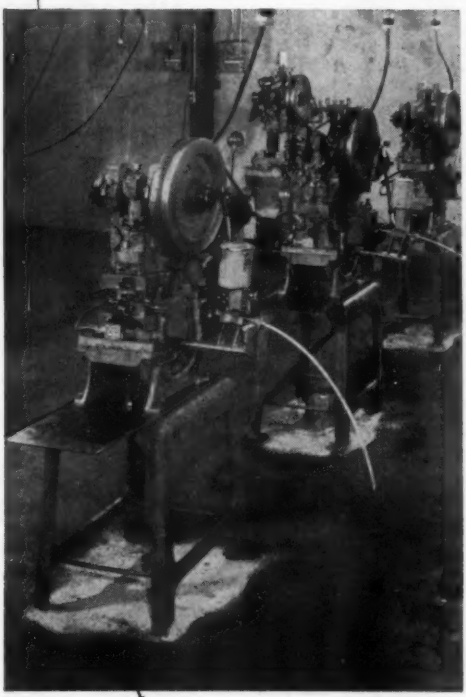

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M

M. B. Manufacturing Company 326
Machine Tool Publications 341
Madison-Kipp Corporation 231
Manhattan Supply Company 312
Martin Machine Company, J. E. 337
Marvel Tool & Machine Company 309
Masters 340
MBI Export & Import, Ltd. 78
Melin Tool Company 165
Michigan Chrome & Chemical Company ...312
Micro Drill Guide Company 337
Midwest Tool & Engineering Company 295
Modern Industrial Engrg. Company 68
Modern Machine Tool Company 76
Morton Machine Works 217
(Div. Cons. Mch. Tool Corp.)
Montgomery Tool Sales 340
Moore Special Tool Company 79
Morse Twist Drill & Machine Company ...18-19
Morton Machine Works 217
Mummert-Dixon Company 310

N

National Acme Company 216
National Tool Company 235
Nelco Tool Company 226
New York Twist Drill Company 169
Niagara Machine and Tool Works 20-21
Nicholson and Company, W. H. 315
Nicholson File Company 139
Nielsen, Incorporated 312
Nilson Machine Company, A. H. 273
Noble and Westbrook Manufacturing Co. .. 62
Norgren Company, C. A. 157
Northeastern Development Engineers 324
Norton Company 66-67, 222
Nu-Tangs, Inc. 300

O

Ohio Knife Company 191
Oliver Instrument Company 31
Oliver Machinery Company 302
O'Neil-Irwin Manufacturing Company 110
Ottemiller Company, Wm. H. 320

P

Parker Machine Company 253
Pedrick Tool and Machine Company 54
Perkins Machine Company 183
Plunket Machine Company, J. E. 338
Pope Machinery Corp. 209
Portland Machine Tool Company 34
Prebco Bushing Company 338
Precision Tool & Manufacturing Co. 316
Precision Welder & Flexopress Corp. 48-49
Procunier Safety Chuck Company 296
Prutton Corporation 26
Putnam Tool Company .....Back Cover

Q

Quality Tool Works 290
Queen City Machine Tool Company 138

R

R and L Tools 15
Racine Hydraulics & Machinery, Inc. 237
Reading Machine Company 339
Ready Tool Company 287
Rehnberg-Jacobson Mfg. Company 282
Reid Brothers' Company, Incorporated 214
Richards Company, J. A. 335
Ring Punch & Die Company 299
Rivett Lathe & Grinder, Inc. 61
Rockford Clutch Division 86
Rockford Machine Tool Company 69
Roll Feeds Corporation 224
Ross Operating Valve Company 102
Rotor Tool Company 33
Royal Oak Tool & Machine Company 59
Ruthman Machinery Company 228
Ryerson and Son, Incorporated, Joseph T. .114

S

Sanford Manufacturing Company 205
Scherr Company, Inc., George 325-331
Scully-Jones & Company 30
Seibert & Sons, Inc. 71
Seneca Falls Machine Company 193
Sentry Company 247
Service Machine Company 288
Severence Tool Industries 353
Sheldon Machine Company 238
Sidney Machine Tool Company 93
Sid Tool Company 351
Sigourney Tool Company 204
Simonds Saw & Steel Company 55
Somma Tool Company 250
Sonnet Tool & Manufacturing Company ... 87
South Bend Lathe Works, Inc. 225
Standard Electrical Tool Company 234
Standard Gage Company 171
Standard Pressed Steel Company 74-75
Standard Steel Specialties, Inc. 324
Stark Tool Company 318

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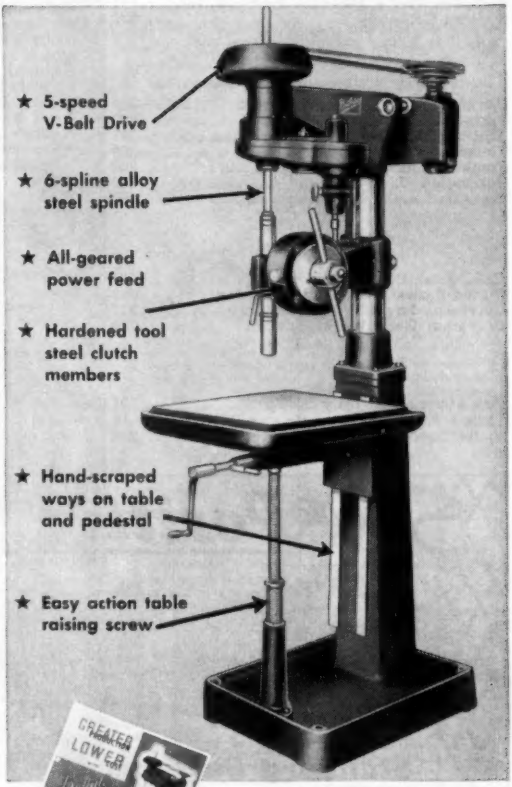
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Starrett Company, The L. S. 221
Sturdimatic Tool Company 305
Sturdy Broaching Service 329
Sundstrand Machine Tool Company 308
Sun Oil Company 14
Superior Steel Products Corporation 32
Super Tool Company 229
Supreme Products, Inc. 241
Swanson Tool & Machine Products, Inc. ...291
Syntron Company 301

T

Tamms Industries, Incorporated 312
Tech-Pacific Corporation 290
Thriftmaster Products Corporation 298
Tietzmann Tool Company 339
Tomkins-Johnson Company 261
Torrington Company 160
Tree Tool and Die Works 60

U

U. S. Steel Supply Division 207
United States Drill Head Company 203
Universal Engineering Company 317
Universal Gear Works, Inc. 328

V

Van Keuren Company 271
Verson All Steel Press Co. 10
Victor Saw Works 272
Vinco Corporation 99
Vogel Tool & Die Corporation 302
Vulcan Tool Company 22-24, 219

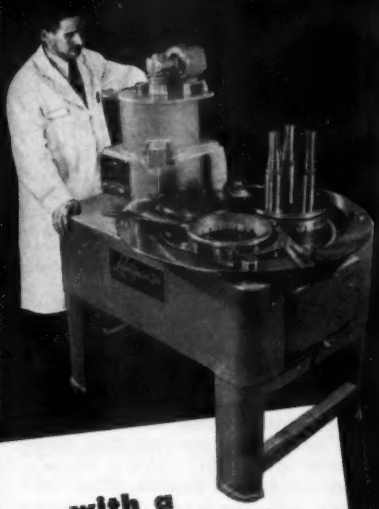
W

Wade Tool Company 2
Wales-Strippit Corporation 248-249
Walker-Turner Division 46
Walls Sales Corporation 324
Walsh Press & Die Company 213
Waltham Machine Works 326
Walton Company 258
Wardwell Manufacturing Company 284
Watts Brothers Tool Works 337
Webber Gage Company 297
Weldon-Roberts Rubber Company 42
(Brightboy Industrial Div.)
Wells and Sons, W. F. 260
Wells Manufacturing Corporation 242
Wesson Company 28-29
Wetmore Tool and Engineering Company .254
Wheel Trueing Tool Company 12-13
Whistler & Sons, S. B. 90
Whitnon Manufacturing Co. 150
Willey's Carbide Tool Company 304
Wilton Tool Mfg. Company 321
Wisconsin Drill Head Company 70
Woods Machine Company, S. A. 50
Woodson Tool Company 330

Z

Zagar Tool, Inc. 44

Lapping For Precision Flatness and Parallelity in Production Quantities



...with a LAPMASTER

This is the machine for you if you want precision flatness in production quantities at low cost. Lapmasters readily lap to the extreme close tolerance of one light band (.0000116") or less. In addition they produce an extremely fine finish to as low as 1 RMS. They are available with 12", 24", 48", 72" or 84" lapping plates.

THIS IS HOW THE LAPMASTER WORKS

I, a heavy cast iron lap plate revolved slowly under power. **II,** large cast iron conditioning rings are held in position and rotate freely on the lap. **III,** work pieces are placed inside the conditioning ring where they also rotate on the lap. **IV,** a liquid vehicle containing fine loose abrasive flows on the lap plate and is uniformly distributed under the work pieces. At the same time the rotating conditioning rings preserve the flatness of the lap plate. These three essential features, combined with the rapid cutting action of loose abrasive produces a flatness which meets every production requirement.

1 Operator requires no previous lapping experience.

2 Lapping with loose abrasive and without excessive pressure eliminates heat and subsequent distortion.

3 Simplicity of design provides accessibility and allows ease of loading and unloading.

4 Loose abrasive distributed evenly over lapping area insured uniform results.

5 Precision laps identical parts in one cycle or parts of various shapes, heights and materials in one cycle.

6 Lap plate always kept in condition while in operation. No down time required for truing or reconditioning.

Learn more about the possibilities of production lapping and the interesting subject of measuring flatness. The illustrated fact-filled booklets are yours for the asking. Write today. **BB-2**

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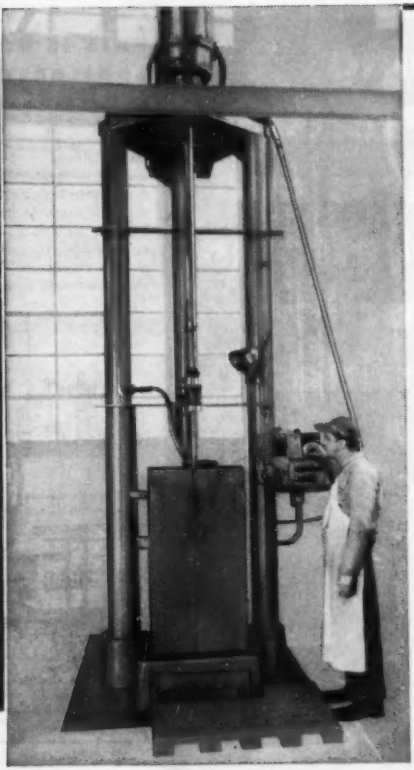
FULMER HONING MACHINES



FREE... get copy of bulletin on honing.

Photo taken in plant of the Frank G. Hough Co., Libertyville, Ill., world's largest tractor-shovel manufacturer.

SPEED exact, uniform, constant, removes up to 1/16" from diameter at 1¼ to 2 cu. in. per min.

ACCURACY achieved through self-aligning hones which remove rough spots from the internal surface and then hone the cylinder to tolerances up to .0001" (plus or minus) on ferrous and non-ferrous metals, plastics, glass, etc.

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Honing machines . . . Hones . . . Stones . . . Fixtures . . . Tools

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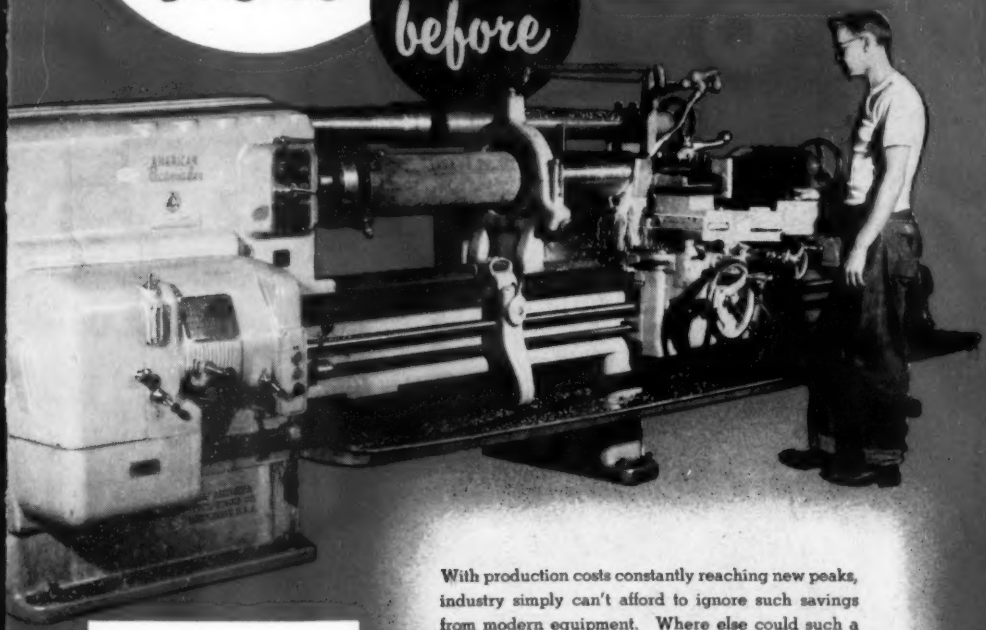
2¼ hrs. now

9 hrs. before

Fairbanks, Morse & Co., Beloit, Wisconsin, is *really* putting the payroll dollar to work with its new 20 inch "AMERICAN" Heavy Duty All-Hydraulic Duplicating Lathe.



2000 horse power Fairbanks-Morse motor shafts are now being rough and finished turned in 2¼ hours floor to floor against a former time of 9 hours per shaft.

With production costs constantly reaching new peaks, industry simply can't afford to ignore such savings from modern equipment. Where else could such a magnificent return upon an investment be secured, and how else can costs be lowered to meet an increasingly competitive market?

More production per man hour is the answer and the only answer to prohibitive costs—modern, high production machinery is the answer to greater production per man hour.

Put your payroll dollar to work for greater profits with "AMERICAN".

Bulletin No. 35 shows many examples—it's yours for the asking.

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